START

0028156

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 152876

Proj. ECN

2. eCN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. Date
Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Supersedure ☐ Discovery ☐ Cancel/Void ☐	ERIC G. ERPENBECK, SWP, G6-47; 376-8032 (8121 1)	APRIL 24, 1991

5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Impact Level
WO25/RMW LAND DISPOSAL FACILITY (ML 6)	200W/218-W-5	3

8. Document Number Affected (include rev and sheet no.)	9. Related ECN No(s).	10. Related PO No.
WHC-SD-WO25-QAPP-001, REV 0	N/A	N/A

11a. Modification Work	11b. Work Package Doc. No.	11c. Complete Installation Work	11d. Complete Restoration (Temp. ECN only)
☐ Yes (fill out Blk. 11b) ☒ No (NA Blks. 11b, 11c, 11d)	N/A	N/A — Cog. Engineer Signature & Date	N/A — Cog. Engineer Signature & Date

12. Description of Change

THIS ECN AFFECTS THE FOLLOWING DOCUMENT: WHC-SD-WO25-QAPP-001, REV 0,
PAGES 1-19,
THE FIRST 19 PAGES, PROCEDURE P-5.0-1, AND 50-60, AND
PROCEDURE P-10.0-1. OF THE ORIGINAL (REVISION 0) 84-102.
QUALITY ASSURANCE PROGRAM PLAN HAVE BEEN
REVISED AND ARE ATTACHED WITH THIS ECN AS REVISION 1.

THIS DIRECT REVISION IS DUE TO A CHANGE IN PROCEDURES P-5.0-1.
& P-10.0-1.

13a. Justification (mark one)	13b. Justification Details
Criteria Change ☐ Design Improvement ☐ Environmental ☐ As-Found ☐ Facilitate Const. ☒ Const. Error/Omission ☐ Design Error/Omission ☐	GENERAL RESTRUCTURING OF DOCUMENT TO COMPLY WITH CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH GOLDER ASSOCIATES INC. APPROVED CONSTRUCTION QUALITY ASSURANCE PLAN.

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RECORD OF REVISION	(1) Document Number WHC-SD-W025-QAPP-001	Page 1

Title

Quality Assurance Program Plan for Project W-025, "Radioactive Mixed Waste Land Disposal Facility - Non-Drag-Off."

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog./Proj. Engr.	(6) Cog./Proj. Mgr.	Date
1 RS	(7) The original QAPP (Rev. 0) has been replaced by Revision 1. ECN 152876 has been approved for this change. Pages 1-19, 50-60, and 84-102 of the original QAPP have been revised. The original QAPP, WHC-SD-W025-QAPP-001, Revision 0, was released on June 26, 1990 via EDT 125907.	Edward H. Esposito 4-25-91	T L Yount	1-26-91

SUPPORTING DOCUMENT

1. Total Pages 156

2. Title	3. Number	4. Rev No.
Quality Assurance Program Plan	WHC-SD-W025-QAPP-001	1

5. Key Words	6. Author
W-025 QAPP	Name: E. G. Erpenbeck Signature Organization/Charge Code 24950/ML6PM

7. Abstract

WHC-SD-W025-QAPP-001 contains the approved Quality Assurance Procedures imposed upon the A/E Firm Golder Associates in the performance of Definitive Design efforts for W-025.

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

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ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 152876

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2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. Date
Supplemental ☐ Direct Revision ☒ Change ECN ☐ Temporary ☐ Supersedure ☐ Discovery ☐ Cancel/Void ☐	ERIC G. ERPENBECK, SWP, G6-47, 376-8032 S1211	APRIL 24, 1991
	5. Project Title/No./Work Order No ML6DP W025/RMW LAND DISPOSAL FACILITY	6. Bldg./Sys./Fac. No. 200W/218-W-5
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		10. Related PO No. N/A

11a. Modification Work	11b. Work Package Doc. No.	11c. Complete Installation Work	11d. Complete Restoration (Temp. ECN only)
☐ Yes (fill out Blk. 11b) ☒ No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

THIS ECN AFFECTS THE FOLLOWING DOCUMENT: WHC-SD-W025-QAPP-001, REV 0, PAGES 1-19, 50-60, AND 84-102, AND 20-26.

THE FIRST 19 PAGES, PROCEDURE P-5.0-1, AND PROCEDURE P-10.0-1. OF THE ORIGINAL (REVISION 0) QUALITY ASSURANCE PROGRAM PLAN HAVE BEEN REVISED AND ARE ATTACHED WITH THIS ECN AS REVISION 1.

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1. ECN (use no. from pg. 1): 152876

15. Design Verification Required	16. Cost Impact		17. Schedule Impact (days)
	ENGINEERING N/A	CONSTRUCTION	N/A
☐ Yes	Additional ☐ $	Additional ☐ $	Improvement ☐
☒ No	Savings ☐ $	Savings ☐ $	Delay ☐

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

N/A

SDD/DD	☐	Seismic/Stress Analysis	☐	Tank Calibration Manual	☐
Functional Design Criteria	☐	Stress/Design Report	☐	Health Physics Procedure	☐
Operating Specification	☐	Interface Control Drawing	☐	Spares Multiple Unit Listing	☐
Criticality Specification	☐	Calibration Procedure	☐	Test Procedures/Specification	☐
Conceptual Design Report	☐	Installation Procedure	☐	Component Index	☐
Equipment Spec.	☐	Maintenance Procedure	☐	ASME Coded Item	☐
Const. Spec.	☐	Engineering Procedure	☐	Human Factor Consideration	☐
Procurement Spec.	☐	Operating Instruction	☐	Computer Software	☐
Vendor Information	☐	Operating Procedure	☐	Electric Circuit Schedule	☐
OM Manual	☐	Operational Safety Requirement	☐	ICRS Procedure	☐
FSAR/SAR	☐	IEFD Drawing	☐	Process Control Manual/Plan	☐
Safety Equipment List	☐	Cell Arrangement Drawing	☐	Process Flow Chart	☐
Radiation Work Permit	☐	Essential Material Specification	☐	Purchase Requisition	☐
Environmental Impact Statement	☐	Fac. Proc. Samp. Schedule	☐		☐
Environmental Report	☐	Inspection Plan	☐		☐
Environmental Permit	☐	Inventory Adjustment Request	☐		☐

19 Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below

Document Number/Revision	Document Number/Revision	Document Number/Revision

20 Approvals

OPERATIONS AND ENGINEERING	Signature	Date	ARCHITECT-ENGINEER	Signature	Date
Cog./Project Engineer	Eric G. Espinoza	4/24/91	PE		
Cog./Project Engr. Mgr.	Timmy L. Yount	4-24-91	QA		
QA	Jack Brodie	4-24-91	Safety		
Safety			Design		
Security			Other		
Proj.Prog./Dept. Mgr.					
Def. React. Div.					
Chem. Proc. Div.					
Def. Wst. Mgmt. Div.			DEPARTMENT OF ENERGY		
Adv. React. Dev. Div.				[signature]	3-1-91
Proj. Dept.					
Environ. Div.			ADDITIONAL		
IRM Dept.					
Facility Rep. (Ops)					
Other					

9 1 1 2 9 1 1 7 2

SUPPORTING DOCUMENT

1. Total Pages 156

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5. Key Words	6. Author
W-025 QAPP	Name: E. G. Erpenbeck Signature Organization/Charge Code 24950/~~ML6PM~~ M46DP

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RECORD OF REVISION

(1) Document Number: WHC-SD-W025-QAPP-001

(2) Title

Quality Assurance Program Plan for Project W-025, "Radioactive Mixed Waste Land Disposal Facility - Non-Drag-Off."

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release		
		(5) Cog./Proj Engr	(6) Cog./Proj Mgr	Dat
1	(7) The original QAPP (Rev. 0) has been replaced by Revision 1. ECN 152876 has been approved for this change. Pages 1-19, 50-60, and 84-102 of the original QAPP have been revised. The original QAPP, WHC-SD-W025-QAPP-001, Revision 0, was released on June 26, 1990 via EDT 125907. All page dates have been Revised			

The following is a summary of instructions to be used in preparing Record of Revision page and how appropriate Engineering Change Notice (ECN) and revisions are identified.

NOTE: Prior to revision of an engineering document, all proposed changes shall have been approved by an ECN.

The Record of Revision sheet shall include the following information.

1) The engineering document number.
2) The title of the engineering document.

Change Control Record

3) The revision number of the change.
4) A description of the change, including page changes, additions, and deletions where appropriate. List the approved ECN number(s) which have been incorporated.
5) The authorizing signature of the Cognizant/Project Engineer signifying accurate editorial incorporation of the previously approved change.
6) The dated signature of the Cognizant/Project Manager authorizing subsequent release of the revised engineering document.
7) List initial issue (usually Rev 0), approval EDT, and date. No signatures are necessary.

Golder Associates Inc.
CONSULTING ENGINEERS

QUALITY ASSURANCE PROGRAM PLAN
FOR
PROJECT W-025, RADIOACTIVE MIXED WASTE (RMW)
LAND DISPOSAL FACILITY - NON DRAG OFF

Revision -3-

prepared for the
U.S. Department of Energy - Richland Operations Office
Contract No. DE-AC06-89RL11615

by

GOLDER ASSOCIATES INC.
Seattle (Redmond), Washington
Richland, Washington

Reviewed and Approved by:

Charles W. Lockhart, Project Director — Date 4/10/91

Patrick Corser, Project Manager — Date 4-10-91

Mary Jo Gorman, Project QA Manager — Date 4-10-91

April 1991

903-1387

Revision Level	Section No.	Revision Description
3	7.2	Revisions due to change in procedure P-10.0-1.
	10.1.1	Revisions due to change in procedure P-10.0-1.
	10.1.2	Revisions due to change in procedure P-10.0-1.
3	Figure 1-1	Revised to include CQA Engineer and CQA Personnel.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

1.0 ORGANIZATION

1.1 Organizational Structure and Project Responsibilities

The overall organizational structure of the Golder Associates Inc. (Golder) project team is shown on Figure 1-1. Primary responsibilities for the implementation of the requirements of this Quality Assurance Program Plan (QAPP) reside with the Project Director, the Project Manager, and technical staff. The Project QA Manager and assigned QA staff are responsible for the overall preparation and revision of this QAPP and its implementing procedures, as well as for monitoring and verifying compliance with QAPP requirements. Additional responsibilities of key personnel are described as follows:

- **Project Director:** The Project Director has ultimate responsibility for technical and quality performance on this project, and for ensuring that all U.S. Department of Energy - Richland Operations Office (DOE-RL) quality assurance, schedule, and budgetary requirements are satisfied.

- **Project Manager:** The Project Manager is responsible for conducting technical activities in compliance with all contractual technical and quality requirements, for coordinating all technical staff activities, for continuing liaison with DOE-RL contract officer's technical representative (COTR) through the completion of all tasks, submittal of routine progress reports, and assessment of all change requests. The Project Manager may delegate specific duties in support of these responsibilities.

- **Project QA Manager:** The Project QA Manager retains overall responsibility for the preparation and update of this QAPP and its supporting plans and procedures; and is responsible for verification of compliance with QAPP requirements through the monitoring, review, inspection, surveillance, and auditing procedures described herein. The Project QA Manager shall maintain current Lead Auditor qualifications as described in Sections 2.3 and 18.0 below. Specific duties in support of these responsibilities may be delegated within the guidelines of governing procedures.

- **Health and Safety Manager:** The Health and Safety Manager is responsible for the review of site safety plans and training programs prepared by Kaiser Engineers - Hanford (KEH) in order to ensure that any field activities conducted on this project by Golder or its subcontractors are performed safely and in compliance with applicable state and federal regulations.

1.2 Subcontractor Support

Subcontractor support for this project will be provided by both Golder and DOE-RL. For all subcontractor support activities that are Golder's responsibility, activity shall be initiated by the Project Director or Project Manager in compliance with the controls for procurement

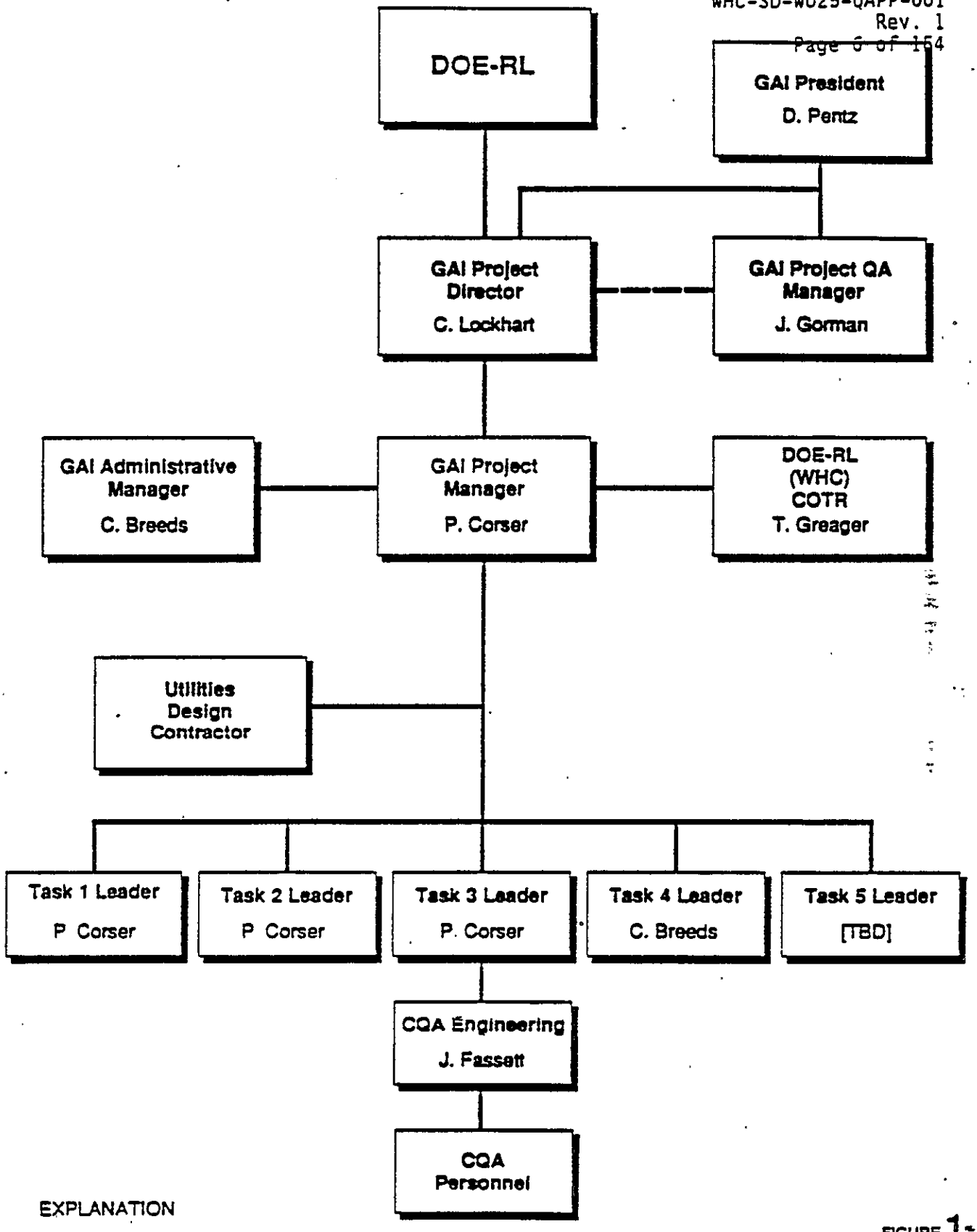

FIGURE 1-1
PROJECT ORGANIZATI
DOE-RL/NON-DRAGOFF RWF PRO

PROJECT NO. 903-1387.100 DWG NO. 28783 DATE 4/2/91 DRAWN LJ

documents and acceptance of procured services described by Sections 4.0 and 7.0 of this QAPP.

2.0 QUALITY ASSURANCE PROGRAM

2.1 Corporate Quality Policy and QA Program Plan Description

It is Golder's corporate policy to establish appropriate QA program controls for all work related to hazardous and/or radioactive mixed waste investigations and related design/ construction activities. This QAPP documents the program controls selected or developed for project W-025, "Radioactive Mixed Waste (RMW) Land Disposal Facility - Non Drag Off." It is prepared in compliance with the applicable requirements of (1) ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities [American Society of Mechanical Engineers (ASME), 1986], which is the standard established for all projects conducted at the Hanford Site by DOE-RL Order 5700.1A, Quality Assurance (DOE-RL, 1983), and (2) the current version of SD-W031-QAPP-001, "Project Specific Quality Assurance Plan W-031 and W-025, Radioactive Mixed Waste Disposal Facility - Drag Off and Non Drag Off." Figure 2-1 is a matrix that cross references the basic requirements and mandatory supplements of ANSI/ASME NQA-1 and SD-W031-QAPP-001 to the specific Golder QAPP sections and supporting plans and procedures that implement the requirements. A list of implementing QA procedures is provided in Figure 2-2.

The primary objective of this QAPP is to provide a procedural framework that will ensure that the design specifications, drawings, reports, analyses, recommendations, construction QA monitoring and inspection services, and all other types of services and assistance provided by Golder meet overall contractual requirements, applicable regulatory requirements, and are consistent with established engineering practices. All contractual changes that expand or otherwise affect the scope of technical activities, quality requirements, or employee health and safety as applicable to Golder or its subcontractors, shall be reviewed and modifications or additions to this plan and its implementing procedures made wherever required.

2.2 Construction Quality Assurance Plan Development Considerations

Within the overall ANSI/ASME NQA-1 QA program structure invoked by this QA Program Plan, the requirements of Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities, EPA/530-SW-86-031, OSWER Policy Directive 9472.00-3, (U.S. EPA, 1986) shall be followed, as appropriate, in the preparation of a secondary Construction Quality Assurance Plan (CQAP) prior to initiating activities on Task III. The CQAP shall address the specific requirements for format and content defined in the EPA technical guidance document cited above, and shall be developed and implemented in compliance with the procedures and controls described by this QAPP. The CQAP shall address specific project-level requirements as appropriate for the scope of Task III, as indicated in Figure 2-1. The implementing procedures referenced in this QA Program Plan may be drawn upon as necessary or appropriate for Task III project-level activities, provided

FIGURE 2-1

NON DRAG-OFF RHW DISPOSAL FACILITY
QUALITY ASSURANCE PROGRAM REQUIREMENTS:
IMPLEMENTING PLAN SECTIONS AND PROCEDURES

Applicable 10CFR50 Appendix B Criteria	Applicable SO-W03I-QAPP-001 Criteria	Title	NQA-1 Basic Requirements	NQA-1 Supplements	GAI QA Program Plan Sections	GAI Implementing Procedures and Secondary Plans
I	1	Organization	BR-1	1S-1	1.0	
II	2	QA Program	BR-2	2S-1, 2S-3	2.0	P-2.0-1, P-18.0-2, CQAP
III	3	Design Control	B-3	3S-1	3.0	P-3.0-2, P-6.0-1, P-10.0-1
IV	4	Procurement Document Control	BR-4	4S-1	4.0	P-4.0-1
V	5	Instructions, Procedures and Drawings	BR-5	--	5.0	P-5.0-1, P-6.0-1
VI	6	Document Control	BR-6	6S-1	6.0	P-3.0-2, P-5.0-1, P-6.0-1, P-6.0-2, P-17.0-1
VII	7	Control of Purchased Material & Services	BR-7	7S-1	7.0	P-4.0-1, P-10.0-4, P-10.0-1
VIII	8	Identification and Control of Material, Parts and Components	BR-8	8S-1	8.0	P-3.0-2, P-10.0-4
X	10	Inspection	BR-10	10S-1	10.0	P-10.0-1, P-10.0-3, P-10.0-4, CQAP
XI	11	Test Control	BR-11	11S-1	11.0	P-3.0-2, CQAP
XII	12	Control of Measuring and Test Equipment	BR-12	12S-1	12.0	P-12.0-1, CQAP
XIII	13	Handling, Storage and Shipping	BR-13	13S-1	13.0	-----
XIV	14	Inspection, Test and Operating Status	BR-14	14S-1	14.0	P-10.0-4, CQAP
XV	15	Nonconforming Items	BR-15	15S-1	15.0	P-15.0-1, CQAP
XVI	16	Corrective Action	BR-16	--	16.0	P-15.0-1, P-18.0-1, CQAP
XVII	17	Quality Assurance Records	BR-17	17S-1	17.0	P-17.0-1, CQAP
XVIII	18	Audits	BR-18	18S-1	18.0	P-18.01, P-18.0-2, CQAP

FIGURE 2-2

PROJECT QUALITY ASSURANCE PROCEDURES

P-2.0-1,	"Training and Orientation"
P-3.0-2,	"Specific Work Instructions"
P-4.0-1,	"Procurement Document Control"
P-5.0-1	"Distribution and Control of Golder Associates Procedures"
P-6.0-1	"Engineering Drawing and Specification Control"
P-6.0-2	"Control of Correspondence and Communications"
P-10.0-1	"Technical Review"
P-10.0-3	"Surveillance Inspection"
P-10.0-4	"Receiving Inspection"
P-12.0-1	"Calibration and Maintenance of Measuring and Test Equipment"
P-15.0-1	"Control of Nonconformance Incident Reports, and Corrective Action."
P-17.0-1	"Quality Assurance Records Management"
P-18.0-1	"Audits"
P-18.0-2	"Auditor Qualifications"

that they are acceptable in the context of the Technical Guidance Document (U.S. EPA, 1986). Specific requirements for CQAP format and content shall be considered in the preparation and review of the SWIs for its development; see Section 3.0 below.

2.3 Training and Qualification of Project Personnel

All project personnel shall be trained in the specific application of this QA Program Plan and its implementing procedures, to the extent appropriate for their work activities. Technical and QA staff training shall be conducted in compliance with procedure P-2.0-1, "Training and Orientation." Auditor/Lead Auditor training and qualification shall be in accordance with procedure P-18.0-2, "Auditor Qualifications." Training records shall be maintained in corporate QA files. Subcontractor training shall be performed to the extent required by individual SWIs and/or procurement documents. Personnel qualifications shall be documented by professional resumes and other verifiable credentials. Qualification and certification requirements for Construction Quality Assurance (CQA) inspectors and receiving inspectors for Task III activities shall be defined in the CQAP and shall be completed prior to initiating task activities.

2.4 Authority of QA Personnel

QA personnel assigned to this project shall have direct access to all levels of the technical organization of Golder or any of its subcontractors; they are specifically delegated the necessary organizational independence and authority to identify conditions adverse to quality, initiate corrective action processes, and otherwise ensure proper implementation of the QA program discussed in this plan. Such authority extends to the stopping of work, if required in response to serious quality problems or extreme situations.

2.5 Management Assessments

The QA Manager shall prepare an annual report to Golder management summarizing audit observations, findings, and any nonconformance activity resulting from inspections or surveillance. The report shall summarize corrective actions taken, and shall discuss any quality problem trends observed during the previous year. In addition to the QA Manager's report, an independent assessment of the effectiveness of the QA program prepared for this project shall be made at least annually by an upper management representative designated by the Office Manager. Both final reports shall include recommendations for any additional corrective action, and shall be submitted to the Office Manager and President, with copies to the Project Director and the Project QA Manager. Management assessment reports may address multiple projects with similar requirements.

3.0 DESIGN CONTROL

3.1 Task Management Process

The structure and technical content of deliverable plans, procedures, reports, drawings, laboratory analyses, or other work products shall be controlled by the application of appropriate QA procedures. All work on this project shall be initiated and controlled by means of SWIs issued in accordance with procedure P-3.0-2, "Specific Work Instructions." SWIs shall be prepared by the Project Director or Project Manager, and shall address all required technical activities. All SWIs require approval by the Project QA Manager or a qualified designee prior to issue.

3.2 Design Input and Analysis

Basic design input parameters, including reference specifications and conceptual drawings or sketches, shall be defined in SWIs to the designers in sufficient detail to provide a consistent baseline supporting design development, analysis, review, and evaluation of future design changes. All modifications to SWIs addressing design input or analysis shall document the source and rationale for the modifications, and shall be subject to the same review and approval cycles as the initial SWI as described in procedure P-3.0-2, "Specific Work Instructions." All design analyses shall be performed in compliance with governing SWI instructions, which shall specifically require a definition of the objective of the analysis, definition of design inputs and sources, literature search results or other background data, identification of any assumptions (indicating those which must be verified in the design process), and identification and full documentation of any computer program applications made as part of the analysis. All design analyses and supporting calculations shall be recorded on standard Golder engineering paper; shall be identified by subject, project number, and analyst's name; shall be checked and approved by the reviewer named in the governing SWI; and, when complete, shall be retained in the project quality records in compliance with Section 17.0 below.

3.3 Design Review Requirements

All design deliverables shall be reviewed and approved prior to submittal to the client in compliance with P-6.0-1, "Engineering Drawing and Specification Control" and/or P-10.0-1, "Technical Review", as appropriate for the type of deliverable. Identical review requirements apply to draft documents presented for client review and final documents incorporating client comments. Reviewer selection, documentation requirements, and other detailed requirements specific to engineering drawings and specifications are controlled by use of procedure P-10.0-1, as invoked by P-6.0-1; a detailed description of the main features of the technical review process embodied in P-10.0-1 is provided in Section 10.1 below. Any special conditions, client requirements, or other applicable quality requirements that may affect the performance of the review shall be identified on the SWI initiating the activity.

3.4 Design Change Requests

All change requests applicable to Golder drawings or specifications shall be documented and dispositioned as required by P-6.0-1, "Engineering Drawing and Specification Control." Change requests applicable to client drawings and specifications applicable during Task III shall be initiated using client engineering change request procedures as outlined in the CQAP.

4.0 PROCUREMENT DOCUMENT CONTROL

All project-related procurement documents shall be prepared, reviewed, and issued as required by procedure P-4.0-1, "Procurement Document Control." Justification for selection of suppliers or consultants shall be documented by memorandum and retained in the project quality records in compliance with Section 17.0 below. Subcontractors shall be required to work under the provisions of this QAPP to the extent appropriate for the service or item being procured. QA Program Plan provisions may be invoked directly, without modification, or, at the Project QA Manager's discretion, may be interpreted to suit the complexity of the procurement and/or the subcontractor's own QA program capabilities. Subcontractor QA requirements shall be included in procurement documents or in task-initiating SWIs as discussed in procedure P-3.0-2, "Specific Work Instructions."

5.0 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

QA and technical requirements for all activities affecting quality shall be specified by means of SWIs, the QAPP, the CQAP, individual QA procedures, and/or technical procedures. Preparation, review, approval, distribution, and revision control of SWIs is addressed by P-3.0-1, "Specific Work Instructions"; similar controls applicable to the QA procedures listed in Figure 2-2 and any technical procedures that may be required by the CQA plan are controlled by procedure P-5.0-1, "Distribution and Control of Golder Associates Procedures." The work plan, the QAPP, and the CQAP shall be reviewed as noted in 10.1.1, and shall be approved by the Project Director, the Project Manager, and the Project QA Manager. They shall be subject to the distribution and revision controls described in Sections 8.4 and 8.5 of P-5.0-1. Preparation, review, approval, distribution, and revision control of engineering specifications and drawings shall be as specified by procedure P-6.0-1, "Engineering Drawing and Specification Control", with the exception that drawing format shall be in compliance with DOE-RL standards as specified by the client's COTR.

6.0 DOCUMENT CONTROL

Once client approval has been received, the work plan, this QAPP, the CQAP, and their implementing procedures shall be subject to the controlled distribution requirements contained in P-5.0-1, "Distribution and Control of Golder Associates Procedures." Controlled copies shall be distributed in accordance with procedure P-5.0-1 to designated client

representatives and to all Golder and subcontractor project personnel performing or supervising work. SWIs are subject to similar distribution control requirements as defined in P-3.0-2, "Specific Work Instructions." Copies of the current EPA and American Society for Testing and Materials (ASTM) methods applicable to Golder geotechnical laboratory testing shall be retained in the Golder Geotechnical library, available for laboratory use as required.

All project correspondence or meeting notes that 1) require Golder, Golder subcontractor, or DOE-RL action; 2) provide information necessary for performing the technical scope of work; or 3) modify or significantly affect the existing technical scope of work, shall be documented, distributed, and systematically filed in the project QA records in compliance with procedure P-6.0-2, "Control of Correspondence and Communications" and P-17.0-1, "Quality Assurance Records Management." All telephone contacts that in any way modify or affect the technical scope, budget, schedule, or contractual quality requirements shall be confirmed by letter correspondence. All letter correspondence to DOE-RL shall be reviewed and signed by the Project Director or Project Manager, and shall be retained as project QA records.

7.0 CONTROL OF PURCHASED MATERIAL, ITEMS, AND SERVICES

Golder procurement activities will be confined to those services, materials, items, and equipment that are required to support the technical responsibilities defined by the contract task descriptions. As part of its responsibilities under Task II, Golder will produce baseline engineering drawings and specifications. The client will assume responsibility under its own quality program for drawing and specification change control, updates, and translation into various procurement documents. Quality program controls applicable to Golder procurements are described below.

7.1 Subcontractor Evaluation

All subcontractors shall be evaluated prior to contract or purchase order award; with the single exception discussed in Section 1.2 above, selection shall be based on sole source justification, technical evaluation, QA program evaluation, and/or competitive bid as described in procedure P-4.0-1, "Procurement Document Control." Justification for selection of suppliers or consultants shall be documented by memorandum and retained in the project quality records in compliance with Section 17.0 below. All subcontractors shall be required to work under the provisions of this QAPP to the extent appropriate for the service or item being procured. Subcontractors shall comply with the specific QA requirements clauses included in their procurement documentation and/or accompanying SWIs.

7.2 Acceptance of Procured Services

If a subcontracted service results in a report, formal comments, analyses, or other work product, acceptance of the service will normally be by completion of at least one technical review in accordance with procedure P-10.0-1, "Technical Review", as described in Section

10.0 below. Additional reviews may be required at the discretion of the Project Manager. If appropriate for a particular task, subcontractors may be requested to perform an internal independent technical review in compliance with the specific QA requirements of the applicable procurement document and/or initiating SWI. If such an option is permitted, the subcontractor shall submit the completed document with all required review documentation for final review by the Project Manager prior to submittal to the client.

7.3 Acceptance of Procured Items

Acceptance of procured items shall be based on the requirements defined by procedure P-10.0-4, "Receiving Inspection."

8.0 IDENTIFICATION AND CONTROL OF MATERIAL, PARTS, AND COMPONENTS

Procured items shall be physically marked or tagged with the Golder purchase order number, purchase order item number, date of acceptance, and acceptance stamp as required by P-10.0-4, "Receiving Inspection." If field sampling activities by Golder or subcontractor personnel are required as part of a particular task, sample identification and any chain of custody control requirements shall be as defined by governing SWIs (and/or the CQAP if performed as part of Task III).

9.0 CONTROL OF PROCESSES

The structure and technical content of all deliverable plans, procedures, reports, drawings, or other work products is controlled through the application of the controls defined in this QAPP and the procedures referenced herein. The specific processes of construction monitoring and inspection required under Task III shall be as specified by the provisions of the CQAP and its implementing procedures, as noted in Section 2.2 above.

No special processes (i.e., processes requiring prequalification of equipment, personnel, and procedures) are anticipated for any task under the current contractual scope of work. Should requirements for the use of such processes arise, however, this QAPP and/or the CQAP shall be revised to include appropriate procedural controls, either as a project-specific plan appendix or as a separate procedure developed and approved in compliance with P-5.0-1, "Distribution and Control of Golder Associates Procedures."

10.0 INSPECTION

10.1 Technical Review

10.1.1 General Requirements

All deliverable plans, procedures, reports, drawings, comment responses, recommendations, or other work products produced as a contractual deliverable shall be subject to independent technical review in accordance with P-10.0-1, "Technical Review", by qualified individuals who have not been directly responsible for the preparation of the document being reviewed. Technical reviews are in-depth critical reviews that verify the accuracy of calculations, examine the applicability of references, and verify technical adequacy. All calculations shall be checked, dated, and initialled by both the preparer and the checker prior to presenting the resulting document for review. The Project Manager or designated Task Manager shall specify reviewer assignments and any additional review instructions in the SWI initiating the activity. Reviewer assignments, any additional review instructions, and the required review level shall be identified in the SWI initiating the activity. Comments made as part of the review process are either mandatory or nonmandatory; all mandatory comments shall require formal documentation of comment resolution as required by the procedure. 3

10.1.2 Subcontractor Technical Review Requirements

Subcontractor authors may be required to participate in the technical review process as described in 10.1.1 above. Alternately, subcontractors may be requested to perform internal independent technical reviews, if appropriate for a particular task or activity as noted in 7.2 above. In the latter case, technical review requirements shall be based on interpretations or extractions of P-10.0-1 requirements, tailored for the specific needs of the task by the QA Manager as part of the procurement document/SWI review process. If such an option is permitted, the subcontractor shall submit the completed document with all required review documentation for final review by the Project Manager prior to submittal to DOE-RL. The Project Manager may request additional reviews in compliance with P-10.0-1 requirements, or may document approval by the letter transmitting the document to the client. 3

10.2 Surveillance Inspection

Procedure P-10.0-3, "Surveillance Inspection", provides guidance for conducting surveillance inspections of field, office, and laboratory testing operations to verify compliance with governing plans and procedures; surveillance inspections may be requested at the discretion of the Project Director, Project Manager, Project QA Manager, or the client's COTR. The procedure assigns specific responsibilities for schedule development and inspection, and requires the resolution and corrective action of all observed nonconformances in accordance with procedure P-15.0-1, "Control of Nonconformances, Incident Reporting, and Corrective Action." Provisions are included in the procedure for issuing stop work orders if required.

10.3 Receiving Inspection

Receiving inspection in compliance with procedure P-10.0-4, "Receiving Inspection", shall be performed on all items procured for this project that are directly related to the quality of deliverable work products, testing, or field activities. Receiving inspection of liner materials shall also be performed on behalf of the client under Task III; specific inspection duties over and above P-10.0-4 requirements shall be enumerated in the CQAP. All receiving inspection shall be performed by inspectors designated and certified by the Project QA Manager and Project Manager. All designated inspectors shall receive formal training in the requirements of P-10.0-4 and the CQA, as appropriate, in compliance with P-2.0-1, "Training and Orientation."

11.0 TEST CONTROL

Acceptance test plans and procedures, the CQA developed for Task III activities, and/or other test plans and procedures required as part of particular task activities shall, as appropriate, require the incorporation of, or references to, detailed technical instructions for test performance. At a minimum, test plans or procedures shall consider the following items:

- Test prerequisites, such as instrumentation and calibration requirements, applicable design requirements, equipment precision and accuracy requirements, cautionary information regarding potential sources of error or inaccuracy, a total equipment list, test personnel qualification requirements, test schedule requirements, environmental considerations, and data collection or storage requirements;

- Definition of quantitative and qualitative completion or acceptance/rejection criteria;

- Definition of any DOE-RL (WHC) and/or Golder inspection, hold, witness, or surveillance points. At a minimum, in compliance with SD-W031-QAPP-001 requirements, the CQAP prepared under Task III shall include mandatory client witness points for bentonite installation, liner installation and welding, electrical system testing, nondestructive examination of piping welds, pressure testing of the leachate collection system, and acceptance testing; mandatory client surveillance points shall be established for asphalt pavement installation, heat trace testing, leachate collection system pipe welding, and leachate collection tank integrity testing;

- Methods for documenting or recording test data and results; and

- Methods for evaluating test data or test reports.

All geotechnical laboratory test procedures shall be in compliance with the latest edition of EPA or ASTM methods as invoked by SWI or CQAP requirements.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

All measuring and test equipment owned or leased by Golder that is used in field or geotechnical laboratory investigations shall be controlled in compliance with procedure P-12.0-1, "Calibration and Maintenance of Measuring and Test Equipment", and the requirements of the CQAP or applicable SWIs.

13.0 HANDLING, STORAGE, AND SHIPPING

All handling, storage, and shipping requirements applicable to procured items shall be as defined in applicable procurement documents in compliance with P-4.0-1, "Procurement Document Control." Similar requirements applicable to measuring and test equipment shall be contained in individual equipment files as described in P-12.0-1, "Calibration and Maintenance of Measuring and Test Equipment." Any specific requirements for geotechnical laboratory custody controls and special handling and storage requirements shall be included in the SWIs initiating the activity.

14.0 INSPECTION, TEST, AND OPERATING STATUS

Items, materials, and references procured by Golder shall be accepted by receiving inspection and shall be marked or identified with acceptance tags as described in P-10.0-4, "Receiving Inspection." Rejected items will be tagged as described in procedure P-15.0-1, "Control of Nonconformances, Incident Reporting, and Corrective Action." Facility construction inspection and completion status reports under Task III shall be logged and documented as described in the CQAP; see Section 2.2 above.

15.0 NONCONFORMING ITEMS

Procedure P-15.0-1, "Control of Nonconformances, Incident Reporting, and Corrective Action", establishes a system for the identification and reporting of nonconformances related to the use of approved procedures, drawings, or specifications. It provides for identification of causes, disposition and implementation of corrective action measures that may be required to reduce or preclude future occurrences and will apply to all technical activities that are completely within Golder purview. Deficiencies and nonconformances may be observed as a result of receiving inspection or surveillance inspection activities as discussed in Section 10.0 above. For Task III, defects observed as a result of routine construction inspection shall be documented and distributed for immediate correction as required by the CQAP; client nonconformance reporting procedures shall be invoked when such defects are not corrected within the conditions and guidelines established by the CQAP.

16.0 CORRECTIVE ACTION

As discussed in Section 15.0 above, procedure P-15.0-1, "Control of Nonconformances, Incident Reporting, and Corrective Action", provides for the identification of causes, disposition and implementation of corrective action measures that may be required in order to reduce or preclude future nonconformances. Corrective action requirements related to audit findings or observations are addressed in procedure P-18.0-1, "Audits." Corrective action requirements related to defects observed during routine construction inspections shall be defined in the CQAP.

17.0 QUALITY ASSURANCE RECORDS

17.1 General Requirements

Project QA records shall be retained and managed as required by procedure P-17.0-1, "Quality Assurance Records Management." For the purposes of this project, the function of Record System Administrator shall be assumed by the Redmond Office Project Secretary. Duplicate records are required; storage facilities shall meet the duplicate storage requirements defined in the procedure. The project QA records file organization shall be defined in the form of a records index, and shall be prepared by the Redmond office Project Secretary with guidance from the Project Manager and Project QA Manager. The project file organization shall be organized to accommodate expansion. Additional sections and subheadings may be added as required due to increased activity or requirements for more specific detail in individual tasks. The records index shall be actively updated; corrections and additions may be made by hand, but shall be formally updated on at least a monthly basis. An updated copy of the index shall be routed to the Project QA Manager whenever it is formally updated. When specified by the client, "permanent" or "nonpermanent" records classification shall be noted on the records index and maintained on the index through records turnover.

17.2 Working Files

Working documents may be retained at the Golder project office, other Golder offices, or subcontractor facilities within the allowances of P-17.0-1. Working file organization is at the discretion of the activity, but must contain all SWIs, all procurement or contractual documentation, and any other documentation specifically required by the SWIs or procurement documents. Standard metal filing cabinets shall be used for temporary storage of working documents.

17.3 Records Turnovers

Records turnovers shall be performed at the direction of the client's COTR. The Project Manager shall inform the Project Secretary of any records turnover requirements. The Project Secretary shall update the project QA records index, remove the original records

from storage, and place them in order in individual records boxes. Box indexes and labels shall be prepared, based on the updated index. The Project QA Manager or designee shall review the completed turnover package, and, if acceptable, seal boxes pending turnover to the client. Shipping instructions shall be provided by the Project Manager.

18.0 AUDITS

One comprehensive internal audit shall be performed by Golder in the first quarter of project activity; additional audits may be performed at the request of the Project Director, Project Manager, Project QA Manager, or client's COTR. All audits shall be performed in accordance with procedure P-18.0-1, "Audits" by a Lead Auditor and audit team qualified in compliance with procedure P-18.0-2, "Auditor Qualifications."

CONTROLLED DOCUMENT

Golder Associates Inc.

Quality Assurance Procedure

Number: P-2.0-1
Title: TRAINING AND ORIENTATION

Prepared By:	Approved	Approved	Effective Date	Rev. Level
[illegible] 4-2-90	[illegible] 4/3/90	[illegible]	9/3/90	7
[illegible] 5-17-91	[illegible] 5/2/91	[illegible]	5/17/91	8

9 1 9 6 5

Record of Revision

Revision Level	Page Number	Section Number	Revision
8	1 and 2	5. and 8.1	revised to allow QA Manager or designated project personnel to perform training and orientation

1. PROCEDURE

The purpose of this procedure is to provide guidelines for conducting and documenting training and orientation of project personnel in the contents of the general requirements, plans, procedures, and instructions invoked to control or direct project quality.

2. APPLICABILITY

This procedure applies to all Golder Associates personnel performing or managing activities under project-specific Quality Assurance Program Plan (QAPP) requirements.

3. DEFINITIONS

None.

4. REFERENCES

4.1 Golder Associates Quality Assurance Procedure P-3.0-2, "Specific Work Instructions."

4.2 Golder Associates Quality Assurance Procedure P-5.0-1, "Distribution and Control of Golder Associates Procedures."

5. DISCUSSION

Training and orientation of project personnel is a shared responsibility of Project and QA management. Whenever this procedure is invoked by project-specific QAPP, the QA Manager or designated project personnel shall provide personnel newly assigned to the particular type of project a general orientation in the regulatory background and hierarchy of the plans and procedures selected to control project activities. They shall also provide specific training in the requirements of the applicable QAPP and referenced QA procedures that are applicable to the work that will be performed by the trainee(s). Technical direction is provided in the Specific Work Instructions (SWIs, see procedure P-3.0-2, "Specific Work Instructions") prepared for each task; additional detailed training in the requirements of SWIs and in any Technical Procedures shall be provided by the Project Manager or designated project personnel. In all cases, training methods, levels, and documentation requirements shall be suitable to the scope and complexity of the technical objectives of the project or task, and shall accommodate variations in individual trainees' education, experience, and level of previous training.

6. RESPONSIBILITIES

6.1 QA Manager (or designee)

The QA Manager is responsible for providing a general orientation in the regulatory background and hierarchy of project-controlling plans and procedures; for training of all project staff in the proper use and application of QA procedures and project-specific QAPPs; for selecting training methods appropriate for the complexity of the plan or procedure, the type of personnel assignment, previous training and experience, client requirements, and other factors; and, for reviewing training session records prior to routing to QA and project files.

6.2 Project Manager (or designed Task Leader)

The Project Manager is responsible for providing technical direction to project staff through the use of SWIs; for providing additional training in technical requirements when required by task complexity; for providing training in the individual technical procedures invoked by SWIs or the QAPP; for selecting technical training methods appropriate for the complexity of the task or technical procedure, the type of personnel assignment, previous training and experience, client requirements, and other factors; for forwarding all technical training memoranda, meeting notes, or records to the QA Manager for review; and, for notifying the QA Manager of any changes or additions to project staff or their functional assignments.

7. MATERIALS

7.1 Controlled Document Transmittal/Reading Training Memorandum (Exhibit A)

7.2 Personnel Training Record forms (Exhibit B)

8. PROCEDURE

8.1 Orientation

Orientation sessions shall be held by the QA Manager or designated personnel when the Project Manager advises that technical personnel have been newly hired, or have been assigned to a particular type of project for the first time.

As a general guideline, orientation sessions should address Golder's corporate quality policy, background regulatory information, applicable regulations and standards likely to be encountered by the employee, the general responsibilities of project personnel for implementing QA program requirements in their work, a general discussion of the role of QAPPs and their implementing QA and technical procedures, and a general discussion of proper recordkeeping practices. Orientation sessions should be documented using training record forms as discussed in 8.4.3 below.

8.2 QA Training

QA training activities shall be initiated whenever new or revised QA procedures or plans are issued, whenever SWIs invoking QA plan or procedure requirements are issued to untrained personnel, whenever requested by a Project Manager, or whenever deemed necessary by the QA Manager. Methods, content, and documentation shall be in accordance with the requirements and guidelines of Section 8.4 below.

8.3 Technical Training

Technical procedure training shall be initiated whenever new or revised technical procedures are issued, whenever SWIs invoking technical procedure requirements are issued to untrained personnel, or whenever requested by the Project Manager. Methods, content, and documentation shall be in accordance with the requirements and guidelines of Section 8.4 below.

Additional technical training shall be performed whenever (at the discretion or request of the Project Manager or designed Task Leader) the complexity of a work assignment requires additional detailed instruction to emphasize, clarify, or elaborate upon the requirements of the SWI. Training sessions shall be held as discussed in 8.4.3 below.

8.4 Training Methods

The following training methods shall be used singly or in combination based on: the complexity of plans, procedures, or instructions and their relationship to project quality; the type of personnel assignment; previous training and experience of the trainee or trainees; specific client requirements as expressed in the QAPP; and other factors. General guidelines for methods selection are provided for each type.

8.4.1 Reading Training

Project personnel shall be required to read and acknowledge their understanding of all formally distributed QAPPs, QA procedures, technical procedures, or project-specific activity plans. Since all such documents will be under controlled distribution in accordance with requirements or procedure P-5.0-1, "Distribution and Control of Golder Associates Procedures", documentation of completion of reading training is provided by signature on the Controlled Document Transmittal/Reading Training Memorandum (see Exhibit A).

Reading training generally may stand alone as a training method when recipients have been under controlled distribution for previous versions, when revisions are minor, when the recipient has participated in the development or revision of the procedure, or when procedure usage by the recipient is likely to be minimal.

8.4.2 Training Memoranda

Explanatory memoranda should generally be issued with distributed documents when procedures or plans are newly issued, or when personnel have not been trained in previous versions, or when major revisions have been made, or when deemed necessary by the QA Manager or Project Manager due to interpretation problems in actual use. Such memoranda should summarize the major points of the procedure or plan with emphasis on any new requirements or changes. Acknowledgement of understanding of the requirements of individual procedures and training memoranda shall be documented by signature on the transmittal/training memo (Exhibit A). Copies of the memorandum and the signed memo shall be retained in corporate QA files and project files when appropriate.

8.4.3 Training Session

Training sessions should generally be held when QAPP or procedure changes are major in nature, when they result from significant nonconformances or audit findings or observations, or whenever additional training relative to SWI requirements has been deemed necessary by project management. Training sessions should be documented on a Personnel Training Record (see Exhibit B) or by a memorandum to file supplying the same information.

8.5 Subcontractor or Consultant Training

Unless otherwise directed by the Project Manager and QA Manager, subcontractor or consultant training shall be provided by detailed instructions appended to their work packages, or, if appropriate, by controlled distribution of appropriate plans and procedures. In such cases, subcontractor or consultant understanding and acceptance of such plans and procedures shall be documented by signature on the transmittal/training memo (Exhibit A). Copies of the signed memo and any accompanying memoranda shall be retained in corporate QA and project files.

TO: Otterson, Joey DATE: 03/27/90

FR: GLENN MILLS LOCATION: Seattle

RE: CONTROLLED DOCUMENT TRANSMITTAL / READING TRAINING MEMORANDUM

_____ ACKNOWLEDGEMENT OF RECEIPT AND TRAINING

Attached is your controlled copy of the referenced document(s). Read each document and destroy any previous revisions in your possession. Please sign below acknowledging receipt and completion of reading training. If you have any questions, contact Glenn Mills at (206) 883-0777.

_____ ACKNOWLEDGEMENT OF RECEIPT

Attached is your controlled copy of the referenced document(s). Please sign below acknowledging receipt. If you have any questions, contact Glenn Mills at (206) 883-0777.

_____ _____
Signature Date

DOCUMENT	REVISION LEVEL
TP-1.2-3	0

cc: Corporate QA personnel files
Project file

Return signed transmittals to:

GOLDER ASSOCIATES INC.
QUALITY ASSURANCE GROUP
4104 148TH AVE. N.E.
REDMOND, WA 98052

P-2.0-1 EXHIBIT B

Golder Associates, Inc.

PERSONNEL TRAINING RECORD

Training Session Date:_____ Trainer:_____

Reference Requirements, Procedures, Plans or Instructions:_____

_____

_____

Attendees:

Name (print)	Signature	Name (print)	Signature
Name (print)	Signature	Name (print)	Signature
Name (print)	Signature	Name (print)	Signature
Name (print)	Signature	Name (print)	Signature
Name (print)	Signature	Name (print)	Signature

Summary:_____

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_____

Reviewed by:_____ Date:_____

cc: QA files
Project file _____
Job/Task No.

Golder Associates Inc.

Quality Assurance Procedure

Number: P-3.0-2
Title: SPECIFIC WORK INSTRUCTIONS

Prepared By:	Approved	Approved	Effective Date	Rev. Level
M. J. Allison 4-2-96	[illegible] 4/3/96	[illegible]	4/3/96	6

RECORD OF REVISIONS

Revision Level	Page No.	Section No.	Revision
6	1	4.0	deleted uncited references per latest revision P-5.0-1
	2	6.4	minor editorial correction
	3	8.1	deleted requirement for work start date
	5	8.6	minor editorial correction

1. PURPOSE

This procedure provides methods for documenting and initiating work using Specific Work Instructions (SWIs).

2. APPLICABILITY

SWIs shall be prepared under the requirements of this procedure for:

- All work associated with the production of contract deliverables.
- Letters or other communications that contain data, evaluations, results of analyses, recommendations, or other information which will be used in site characterization, design, testing, or performance assessment activities.
- Provision of formal comments to the client.
- Initiation or procurement activities, including renegotiation of consulting agreements. (Note: Project Managers may issue Purchase Orders directly, without preparing SWIs.)
- Initiation of field activities.
- Any other situation requiring, at the Project Manager's discretion, a documented means of assigning work.

3. DEFINITIONS

3.1 Specific Work Instructions (SWI)

SWIs are controlled documents that describe the scope of work or activities to be performed, and provide specific direction to the extent necessary to achieve the desired results. SWIs serve as the basic authorization to perform work and shall be issued to all assigned field, laboratory, and office personnel prior to the commencement of work. Requirements for the use of specific procedures or specifications are included; due dates and time charging instructions may also be provided when appropriate.

4. REFERENCES

None.

5. DISCUSSION

SWIs provide the means for ensuring that personnel performing work are assigned appropriate project and task numbers; that appropriately detailed guidance for performing the work is provided; that special requirements or considerations affecting the performance of the work are identified; and, that internal and subcontractor interfaces are identified where necessary.

6. RESPONSIBILITIES

6.1 Project Manager

The Project Manager (or designee) is responsible for the initiation and approval of SWIs for applicable project activities.

6.2 QA Manager

The QA Manager (or designee) is responsible for reviewing and approving SWIs to ensure compliance with client requirements, and to ensure that applicable procedures and documentation for the control of quality-related activities have been incorporated.

6.3 Project Secretary

The Project Secretary is responsible for issuing a control number for each SWI, keeping a current SWI log, filing the SWI in the project QA records, and distributing the SWI as required by this procedure.

6.4 Technical Staff

Individuals issued SWIs are responsible for completing assigned tasks in accordance with the guidelines provided. SWIs shall be retained in the individual's work area; superseded revisions of SWIs shall be discarded or marked "Superseded." Questions regarding SWI interpretation shall be addressed to the Project Manager or QA Manager as appropriate.

7. MATERIALS

SWI Forms (See Exhibit A)

8. PROCEDURE

8.1 Preparation

SWIs may be typed or handwritten, using the form shown in Exhibit A. The Project Manager or designated preparer shall fill in all applicable portions except for the control number and file number. The required information for each blank is listed below, keyed to the numbers in the blanks in Exhibit A.

1. **Project:** Enter the client and project name.

2. **Date:** Enter the distribution date.

3. **Revision:** Enter the revision number.

4. **Author:** Enter Originator's name.

5. **To:** Enter the name of the individual(s) assigned work.

6. **Subject:** Enter the title of the applicable task, if appropriate.

7. **Job Number:** Enter the Golder Associates job and task number that the work shall be charged to.

8. **Scope or Work:** Briefly state the general scope of activities or purpose of the work assignment.

9. **Specific Instructions:** Provide detailed instructions for completing the task; include references to technical procedures to be used, equipment requirements, references to be investigated, or similar details. Provide attachments as required. If known, include the manhours allotted for the activity and the required completion date. 6

10. **Reporting Requirements:** Describe type of report required, if appropriate, and provide the name of the individual who should receive the report.

11. **Subcontract Interface:** Provide the name of subcontractor contacts as appropriate.

12. Special Handling Requirements: Enter shipping requirements, temperature requirements, special process requirements, special sample processing or special routing or mailing requirements for reports.

13. **Applicable Specifications and Procedures:** Enter any QA procedures, technical procedures, or other applicable work-controlling documents.

8.2 Control Number System and Log

SWIs shall be controlled through the use of unique numbers and revision levels. The Project Secretary shall assign a control number to the SWI in sequential order based on the previously assigned number and enter the number where designated by Block 14 of Exhibit A. A log shall be maintained for all issued SWIs that identifies the number, revision, originator, recipient(s), and subject. A copy of the first page of each SWI shall be retained in a master reference file attached to the log.

8.3 File Number

The Project Secretary shall assign the file location for the SWI as required by the current project QA records index. The number shall be entered where designated by Block 15 of Exhibit A.

8.4 Approval

Completed SWIs shall be forwarded to the QA Manager and Project Manager for review and approval. The QA Manager shall review the SWI to assure compliance with client requirements and to ensure that references to applicable procedures and documents have been incorporated. The Project Manager shall review the SWI for compliance with project needs, content, and completeness of the instructions. Minor corrections of SWI text prior to approval may be made by hand, provided that the change is initialed and dated by the reviewer. The QA Manager and Project Manager shall indicate approval by signing and dating the SWI.

8.5 Distribution

The Project Secretary shall forward copies of approved SWIs to all of the individuals named in Block 5 of Exhibit A, the QA Manager or Coordinator and the Project Manager. The original SWI shall be retained in the Project QA records files.

8.6 SWI Revisions

Whenever an SWI is revised, the revised version shall go through the same approval process as the original. Revisions may be marked on the original SWI by drawing a single line through the old information, adding the changes, and identifying each change by a small delta enclosing the revision number. If revisions are marked on the original, approval of each change must be indicated by initials and date. As an alternative, a separate revised SWI may be prepared. The original document (unless marked up as the revision,) and the corresponding entry on the SWI log shall both be marked as superseded to prevent inadvertent use of outdated documents. 6

P-3.0-2

Exhibit A

SWI

SPECIFIC WORK INSTRUCTIONS

No.: 14.

Project: 1.

Date: 2. **Revision:** 3. **Author:** 4.

To: 5.

cc: QA Coordinator **File No.:** 15.

Subject: 6. **WBS No. or Job No.:** 7.

Scope of Work: 8.

Specific Instructions: 9.

Reporting Requirements: 10.

Subcontract Interface: 11.

Special Handling Requirements: 12.

Applicable Specs. and Procedures: 13.

QA Approval/Date: _____ Project Manager Approval/Date: _____

Golder Associates

CONTROLLED DOCUMENT

Golder Associates Inc.

Quality Assurance Procedure

Number: P-4.0-1
Title: PROCUREMENT DOCUMENT CONTROL

Prepared By:	Approved	Approved	Effective Date	Rev. Level
M.J. [signature] 2/2/90 [signature] 2/2/90	[signature] 2/2/90	[signature] for C W Lockhart 2/2/90	2/2/90	10

RECORD OF REVISIONS

P-4.0-1

Revision Level	Page Number	Section Number	Revision Description
10	1	3.3	clarified review requirement
	3	6.4	deleted section; mandatory President review not required
	5, 6	8.4	expanded discussion of inspection requirements, clarified
	6	8.5	add reference to inspection plans

1. PURPOSE

The purpose of this procedure is to control the procurement of all items, materials, and services and to ensure the quality of such procurements when they have a direct effect on project work.

2. APPLICABILITY

This procedure applies to two general categories of procurements:
1) support-related procurements, which are routine and have no direct influence on project work, and 2) project-related procurements, which do have a relationship or effect on the quality of work. Although applicable to both categories, most of the requirements of this procedure address the project-related category, which may include consulting services, subcontractor services, laboratory services, equipment, materials, or other items.

3. DEFINITIONS

3.1 Procurement Document

A procurement document is a written contract that identifies and/or defines the terms, conditions, technical requirements, and quality requirements which items or services must meet in order to be considered acceptable by the purchaser. A procurement document may be in the format of a consulting agreement, subcontract, or Purchase Order(PO).

3.2 "Project-Related" Procurement Document

A project-related procurement document is directly related to the quality of the end item or work product, requiring in-depth review by QA and project personnel to ensure that all applicable requirements are properly identified to the supplier or consultant. As defined above, the procurement document may be in the form of a consulting agreement, subcontract, or PO.

3.3 Support-Related Procurement Document

A support-related procurement document, usually a PO, has no direct relationship to project quality. As an example, POs for drafting or duplicating services are considered to be support-related. QA reviews are not required.

3.4 Requests for Quotation (RFQs)

A Request for Quotation (RFQ) is a document provided to a prospective supplier or consultant containing all the intended provisions of a procurement document, and is subject to the same approval cycles. Changes resulting from a prospective supplier's bid response must be incorporated into the procurement document and be subjected to review and approval prior to issue.

3.5 Source Selection

Source selection is the process by which potential suppliers of services or equipment are identified, evaluated and selected. Project-related procurements must receive sole source, technical, or QA evaluations prior to selection. Support-related services do not require such evaluation.

3.6 Sole Source

Sole source selection is one option in the source selection process; it involves selection of a supplier or contractor based on the uniqueness or recognized reputability of the item or service offered without a formal evaluation of alternative sources. Sole-source selections for project-related procurements require documentation of the justification.

4. REFERENCES

4.1 Golder Associates QA Procedure P-3.0-2, "Specific Work Instructions"

5. DISCUSSION

This procedure provides a uniform method of assuring that all applicable requirements have been met on procurement documents. The level of control required depends on whether or not the procurement has a direct relationship to project quality. The procedure defines the differences between project-related and support-related procurements, describes the required content of project-related procurement documents, defines the review process that ensures inclusion of Quality Assurance (QA) requirements, and provides the methods to be used for controlling procurement document changes.

6. RESPONSIBILITIES

6.1 Project Manager

The Project Manager is responsible for 1) initiating the procurement process, either by direct preparation or by issuing Specific Work Instructions (SWI's, see procedure P-3.0-2), 2) coordinating the preparation and approval of documents between the Contracts Administrator and the QA Manager, and 3) providing the technical specifications for the RFQ or procurement document. The Project Manager is also responsible for ensuring that all required legal and contractual requirements are incorporated into any RFQ for subcontracted services or materials, subcontracts or consulting agreements that result from RFQs, and all extensions or modifications of subcontracts or consulting agreements. If another individual is delegated responsibility for performing any part of the procurement process, the Project Manager shall document the request by means of an SWI.

6.2 QA Manager

The QA Manager reviews procurement-initiating SWIs, RFQs, and any subsequent changes (with the exception of the purely administrative changes noted in 8.4) to ensure that all customer quality requirements are met and to add subcontractor quality requirements appropriate for the procurement.

6.3 Office Manager

The Office Manager or designated Administrative Manager reviews and authorizes all procurement documents (consulting agreements, subcontracts, POs and their extensions or revisions).

7. REQUIRED MATERIALS

None

8. PROCEDURE

Figure 8-1 is a matrix that relates responsibilities and methods for each type of procurement document to each stage of the development of the procurement documentation. The following sections correspond to the developmental stages of the procurement as they are listed in the Figure.

8.1 Initiation

Consulting agreements or subcontracts (and requirements for RFQ preparation if competitive bid techniques are used), as well as project-related or support-related POs, may be initiated directly by the Project Manager or may be delegated by SWI.

8.2 Definition of Requirements

The requirements for project-related procurements shall be generally defined by the initiating SWI or, when requested, by the detailed RFQ. Procurement requirements shall be explicitly included in the documentation, and shall follow the guidelines of section 8.4 below as appropriate. Additional requirements may be added as part of the QA review process described in 8.5 below.

8.3 Source Evaluation and Selection

8.3.1 Evaluation and Selection Methods:

Suppliers, consultants, and subcontractors shall be evaluated and selected by methods appropriate for the category of the procurement and its scope or complexity. It is the responsibility of the Project Manager to determine whether the services are support or project-related. The Project Manager shall select the evaluation method most appropriate for the procurement, consistent with client requirements. In general, project-related procurements will use one or more of these techniques, while support-related procurements will use only the sole source, technical evaluation, or competitive bid techniques. Available methods are as follows:

- Sole Source: Sole source selection may be based on the technical recognition of a supplier's particular expertise and reputation. The Project Manager shall document sole source justification for all project-related procurements and route copies to project and QA files.

- **Technical Evaluation:** Potential contractors or vendors may be selected based on a review of their technical qualifications; a trial purchase may be issued at the Project Manager's option. Acceptable performance may result in a technical recommendation approving the supplier for future use. Documentation of technical evaluations and/or acceptable performance on a trial purchase order shall be routed to the project files and QA files if appropriate for the type of procurement.

- **QA Evaluation:** When requested by the Project Manager, the QA Manager may make evaluations by review of supplier's quality program or procedures or by on-site survey of a supplier's technical and quality capabilities. Copies of the QA evaluation or survey report shall be routed to the project and QA files.

- **Competitive Bid:** Selections made by issuing RFQs and evaluating competitive proposals must be carefully coordinated to ensure that all legal, contractual, and QA requirements are properly included in the RFQ. Results of the evaluation process and reviews of bidder qualifications shall be routed to project and QA files.

8.4 Preparation of Procurement Documentation

Consulting Agreements, Subcontracts, and project- or support-related POs shall be directly prepared by the Project Manager or as delegated by SWI. All procurement documents shall provide the following types of information as appropriate for the item or service procured.

- **Scope of Work:** The document shall provide a statement of the scope of the work to be performed by the supplier, consultant, or subcontractor.

- **Contractual Requirements or Addenda:** All necessary contract documents shall be included in the procurement package. Such documents may include standard terms and conditions, or representations and certifications of the knowledge and acceptance of various federal, state, or local statutes and regulations.

- **Technical Requirements:** All necessary technical requirements, such as compliance with design drawings, design specifications, procedures, codes, traceability requirements, or regulatory requirements shall be defined. Controlled copies of drawings and specifications shall be transmitted with the procurement documents wherever required.

- **QA Requirements:** All project-related procurement documents shall contain a clause requiring the supplier to provide unhampered access to his facilities for the purposes of source inspection, surveillance inspection, or audit. Inspection requirements or other quality requirements appropriate for the item or service shall be included by other appropriate quality clauses or by reference to

separately prepared inspection plans; the level of detail required in such clauses shall be commensurate with the type of procurement, supplier quality capabilities, quality history, and other factors.

- **Documentation Requirements:** The procurement document shall specify any documentation or reporting requirements applicable to the supplier, consultant, or subcontractor. Documentation requirements may be expressed by individual quality clauses or in the body of the procurement document, and shall define required due dates, retention times, and disposition upon completion of the contract.

- **Nonconformances:** When appropriate for the type of procurement; definition of and requirements for reporting of nonconformances shall be included in a specific clause.

- **Spare and Replacement Parts:** When complex equipment is procured, the procurement document shall require the supplier to identify appropriate spare and replacement parts and define any appropriate calibration, retesting, or other activity required for ordering, servicing or repair of the equipment.

8.5 Review and Approval

All procurement documents shall be reviewed by the Project Manager to ensure the inclusion of provisions that will ensure that the items or services to be provided will meet all Golder and client requirements. Project-related procurement documents also require the review and approval of the QA Manager in order to ensure that all required quality provisions are included. If warranted by the complexity of the procurement, inspection plans shall be prepared that identify the specific characteristics to be inspected and the inspection method required. Plans shall be prepared in checklist format, shall be sequentially numbered and identified to the Golder job and task number, and shall be reviewed and approved by the QA Manager prior to use. Inspection plans shall not be provided to the supplier or subcontractor, shall be identified by number in the body of the procurement document, and shall be forwarded to the project QA records when complete. See procedure P-10.0-4, "Receiving Inspection" for additional details on inspection plan use.

Objective evidence of review and approval shall be provided by the Project Manager and QA Manager's signatures on the procurement document.

8.6 Authorization and Final Approval

All procurement documents require authorization by the Office Manager or designated Administrative Manager prior to issue.

8.7 Change Control

All changes made as a result of an RFQ response or precontract negotiations shall be incorporated into the final procurement document prior to issue; the changes shall be evaluated in terms of effect on the original technical, quality, and other requirements. Modifications to design or procedures shall be evaluated, and technical and QA requirements shall be modified as necessary prior to issue. All subsequent changes shall be subject to the same review and approval cycle as used in the preparation of the original documents, with the exception that any revisions made purely for administrative or budgetary reasons shall not require QA review.

8.8 Records Requirements

Procurement-related records shall be retained to the extent appropriate for each procurement type. Project records should contain the following types of documentation:

- Final-approved procurement documents, with all revisions and attachments
- Initiating SWIs
- RFQs and competitive bid responses
- Competitive bid evaluation information
- Sole source justification (if performed)
- Technical justification (if performed)
- QA evaluation (if performed)

Corporate QA files shall contain copies of all QA evaluations, by supplier or consultant.

FIGURE 8-1

Procurement Activity	Responsibilities and Method		
	Consulting Agreement	Project-Related PO	Support PO
Initiation	PM or as authorized by SWI	PM initiates, or delegates via SWI	PM initiates or delegates authority
Definition of Requirements	RFQ or SWI specification by PM or as authorized by SWI	By PM - initiated SWI or PO attachment	PM or designee defines in PO or in PO attachment
Source Selection	Sole source or technical evaluation by PM; or by QA evaluation; and/or by competitive bid	Sole source or technical evaluation by PM; or by QA evaluation; and/or by competitive bid	Best price or per PM direction
Preparation of Procurement Documentation	PM or as authorized by SWI	PM or as authorized by SWI	PM or designee
Review and Approval	PM and QA	PM and QA	PM
Authorization or Final Approval	OM or designee	OM or designee	OM or designee
Changes	Same requirements except admin changes are exempt from QA review	Same requirements except admin changes are exempt from QA review	Same requirements

Golder Associates Inc.

Quality Assurance Procedure

Number: P-5.0-1

Title: DOCUMENT PREPARATION, DISTRIBUTION, AND CHANGE CONTROL

Prepared By:	Approved	Approved	Effective Date	Rev. Level
M. J. Otterson 7-11-90	[signature] 7/11/90	[signature] 7/12/90	7-12-90	10

RECORD OF REVISIONS

Revision Level	Page No.	Section No.	Revision
10	throughout		Revised to address QA and other technical plans and to add Interim Change Notice procedures.

1. PURPOSE

This procedure establishes uniform methods for preparation of technical and Quality Assurance (QA) procedures, and project-specific QA plans. Provisions are also made for the control of the distribution and revision of procedures and plans.

2. APPLICABILITY

The procedures and format described herein are applicable to all Golder Associates Inc. technical and QA procedures, and QA plans. Other types of technical plans, e.g., technical work plans and test plans, may be distributed and revised in accordance with this procedure at the discretion of the QA Manager.

3. DEFINITIONS

3.1 Technical Procedure

A technical procedure is a document that specifies or describes in detail how a technical activity is to be performed. Technical procedures include methods to be employed, equipment or materials to be used, and a planned sequence of operations. Technical procedures are designed to either provide or require a test data sheet, test log, or other work completion records that will provide objective evidence that work was performed in compliance with approved instructions and with appropriate quantitative or qualitative acceptance criteria. To the extent possible, technical procedures shall be written in such a manner as to permit their use on any project. Unique project requirements may be provided for by a project-specific addenda to standard procedures.

3.2 Procedure

A procedure is a document that outlines detailed activities required for implementation of a quality assurance program.

3.3 Quality Assurance (QA) Plan

A QA plan is a program- or project-specific quality planning document that describes the project organization, specifies project QA requirements, and identifies the applicable Golder Associates Inc. procedures, national standards, regulatory guides, codes, or other regulations that affect or direct the performance of project activities.

4. REFERENCES

None.

5. DISCUSSION

Technical procedures, QA procedures, and QA plans shall be prepared, identified, distributed and controlled by the methods and format described in this procedure. Distribution control requirements may also be applied to other types of work-controlling plans (such as test plans or technical work plans) at the discretion of the QA Manager. Revisions of all procedures and plans require the same level of review and approval as the original documents. The author originating a technical or QA procedure or QA plan is responsible for soliciting internal review comments. The author is responsible for resolving comments and obtaining all required approvals.

6. RESPONSIBILITY

6.1 Authors

Authors of technical and QA procedures and QA plans are responsible for obtaining informal reviews from technical or QA staff as appropriate, and for routing procedures and plans through the final review process. Authors are also responsible for resolving all comments resulting from the final review process and for forwarding reviewer comments to the corporate QA files.

6.2 QA Manager

The QA Manager is responsible for reviewing and approving all technical and QA procedures, QA plans, and revisions for compliance with applicable requirements prior to submittal for final approval. The QA Manager is also responsible for systematic controlled distribution of all plans and procedures subject to the requirements of this procedure.

6.3 Senior Technical Staff

Senior staff with experience appropriate for the discipline involved shall participate in the final review and approval of technical procedures, or procedure revisions which may be necessary for compliance with specific client requirements.

6.4 Office Manager

The Office Manager is responsible for performing final review and approval of all QA procedures and revisions.

6.5 Project Manager

The Project Manager is responsible for performing final review and approval of program- or project-specific QA plan and revisions.

6.6 Users

Users of procedures and plans are responsible for maintaining copies of all issued controlled documents, and for returning them when requested. Users are responsible for understanding and implementing the provisions of the distributed procedures and plans, and for participating in training sessions or completing reading training assignments for new and updated procedures and plans.

7. EQUIPMENT OR MATERIALS

- Controlled Document Transmittal/Reading Training Memorandum (Exhibit A)
- Interim Change Notice (ICN, Exhibit B).

8. PROCEDURE

8.1 Document Preparation

8.1.1 Preparation of Technical and QA Procedures

Technical and QA Procedures shall be prepared in accordance with the following guidelines:

- Purpose: Briefly describe the specific purpose of the procedure.
- Applicability: Identify the work activities and/or groups to which the procedure applies.

- Definitions: Define words and phrases having special meaning within the procedure.
- References: List all cited reference documents, such as other related Golder Associates Technical or QA procedures, applicable regulatory guidelines, codes, or standards.
- Discussion: Include a brief, general explanation of the use of the procedure.
- Responsibility: Identify the organizational positions and responsibilities of the individuals charged with the implementation of the procedure.
- Equipment or materials: Identify any equipment, materials, or special forms necessary to support the activity described.
- Procedure: Describe the specific step-by-step procedure or instructions to be followed. When appropriate, provide a flow chart as an exhibit to enhance user understanding.

The procedure shall contain all information necessary for proper implementation. Such information might include data sources, computer programs to be used, specific QA hold points, documentation requirements, and acceptance, rejection, and/or completion criteria.

Each of the subject headings listed above should be developed to the extent appropriate for the procedure. If no detailed discussion is required, "none" shall be placed under the heading.

The author of the procedure shall determine which groups or individuals may be affected by the procedure and shall obtain informal comments prior to presenting a final draft for review.

8.1.2 Preparation of QA Plans

The content and format of QA plans shall be in accordance with the contractual QA specifications, and will normally be prepared in compliance with one or more standard QA program guidance documents. If no guidelines for QA plan preparation are specified in the contract, QA plan format shall be as directed by the QA Manager.

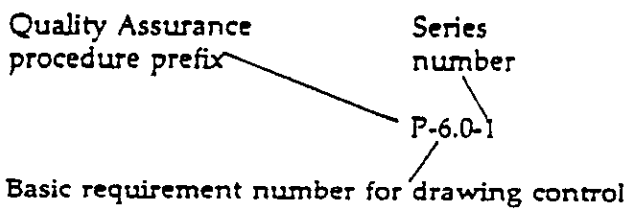
8.2 Document Identification

8.2.1 Identification of QA Procedures

New QA procedures shall be dated and assigned unique letter-number designators by the QA Manager. The complete letter-number designator for a QA procedure shall include the following:

- The letter "P"
- The applicable basic requirement number as identified by the QA Manager or applicable quality policy directives
- A secondary series number

As an example, the first QA procedure for document or drawing control would be as follows:



The first revision of this procedure would be indicated as P-6.0-1, Rev. 1.

8.2.2 Identification of Technical Procedures

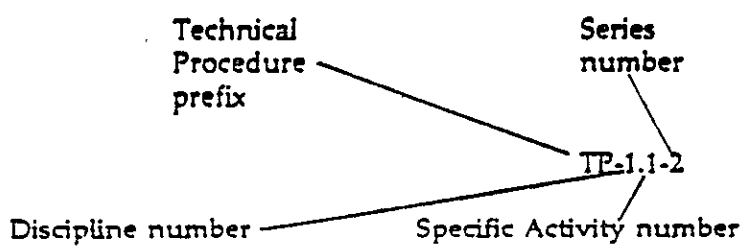
New technical procedures shall be dated and assigned unique letter-number designators by the QA Manager. The letter-number designator for a technical procedure shall include the following:

- The letters "TP"
- The applicable discipline number and specific activity number
- A secondary series number

The following discipline numbers are established for identification of Technical Procedures.

Discipline Description	Number
Field Investigations	1.0
Special Studies	2.0
Laboratory Testing	3.0
(Reserved)	4.0
Data Gathering	5.0
Preparation of Maps or Specialized Graphics	6.0
Geologic Analysis	7.0

Specific activities for each discipline shall be numbered consecutively as technical procedures are written. For example, the second Technical Procedure written for surveying activities supporting field investigations would be as follows:



The first revision of the technical procedure would be noted as TP-1.1-2, Rev. 1.

8.2.3 Identification of QA Plans

The cover sheet of each QA plan shall include the title of the plan, the revision level, the client, the client contract number, the Golder Associates job number, and approval signatures (see section 8.3.3). No unique document number is required.

8.3 Document Review and Approval

8.3.1 Technical Procedures Review and Approval

The author of a technical procedure shall obtain at least one informal review for technical content by appropriate personnel prior to initiation of the formal review cycle. The author shall then route the procedure to the QA Manager and an appropriate senior technical staff member for review and approval. Subsequent comments shall be resolved by the author to the reviewers' satisfaction. A cover sheet indicating the current revision level shall be routed

with the final draft for approval signatures. All review comments made during final review shall be retained in the Corporate QA files and shall be identified to the individual reviewer.

8.3.2 QA Procedure Review and Approval

The author of a QA procedure shall route the procedure to the QA Manager and the Office Manager for review and approval. Subsequent comments shall be resolved to the reviewers' satisfaction. A cover sheet indicating the current revision level shall be routed with the final draft for approval signatures. Any review comments made during final review shall be retained in the Corporate QA files and shall be identified to the individual reviewer.

8.3.3 QA Plan Review and Approval

QA plans shall be reviewed and approved in accordance with the contract QA specifications, or, if no guidelines are specified in the contract, as directed by the QA Manager. At a minimum, however, all QA plans shall be reviewed and approved by the Project Manager and the QA Manager.

8.3.4 Client Approval Considerations

The QA Manager shall determine when client approval of new documents or revisions is required. When client approval is required, the QA Manager shall make the necessary submittals and coordinate resolution of any client comments.

8.4 Distribution

All procedures, QA plans, various technical plans, as required, and subsequent revisions and interim changes, shall be issued either as controlled documents or for information only, as determined by the QA Manager. In all cases, the first page of the issued document shall be marked or stamped to indicate whether it is controlled or for information only. The QA Manager shall supervise distribution of copies of documents to all affected individuals and departments, and shall supervise external distribution to field offices, subcontractors, consultants, or clients. Each controlled document shall be distributed with a controlled document transmittal/reading training memorandum (see the example in Exhibit A) indicating which document and revision level was issued. The individual receiving the document shall follow the instructions of the checked requirements, sign the memo, and return it to the QA Manager for filing in Corporate QA personnel files. Appropriate procedures and plans shall be distributed to personnel prior to the initiation of work. Task Leaders or Project Managers shall provide definition of distribution needs when required. All documents shall be returned to the QA Manager upon termination of employment or upon request if there is no longer a requirement for their use.

8.5 Document Revisions

8.5.1 Technical and QA Procedure Revisions

All QA procedures currently distributed for project use shall be reviewed on at least an annual basis. Technical procedures shall be reviewed at least biennially. The QA Manager is responsible for coordinating the review of QA and technical procedures. All or portions of any required revision may be delegated by the individual responsible for review. Revised procedures shall be reviewed in the same manner as the previous version per the requirements of paragraph 8.3. Reviewers shall assess changes that may be required by the latest editions of applicable national standards, regulatory guides, codes or other regulations. Reviewers shall evaluate suggested changes that may have accumulated during the previous year, and incorporate if appropriate.

8.5.2 Plan Revisions

Requirements for periodic QA plan review may be included in each individual plan. At a minimum, however, QA plans shall be revised as necessary to accommodate changes in contract requirements, or changes in applicable standards, regulatory guides, codes, or other regulations. If necessary, QA plans and other technical work plans or test plans controlled by this procedure may be revised on an interim basis. Interim changes to plans shall be documented on an Interim Change Notice (Exhibit B). All ICNs and plan revisions shall be approved in the same manner as the original plan. Each ICN shall be assigned a unique sequential number, and shall be clearly identifiable to the associated plan and revision level. Interim changes shall be incorporated into subsequent revisions of plans as appropriate. ICNs shall be listed with the applicable plan on the Master Plan Index (see section 8.6).

8.5.3 Revision Level Identification

Each page of a revised procedure or plan shall contain the page number, date, and the most current revision number. The revised sentence or paragraph of each page of a revised document shall be indicated with a vertical line in the right hand margin. Revisions shall be numbered and the revision history documented on the record of revisions page of each document. A controlled copy shall be transmitted to each individual or organization on controlled distribution as described in section 8.4. Records of all previous versions of procedures and plans shall be maintained in the Corporate QA files. All recipients of a revised document shall immediately remove the obsolete document from their personal notebook and destroy it or return it to the QA Manager with the signed document distribution and reading training memorandum.

8.6 Master Procedure and Plan Indexes

A master procedure index and a master plan index shall be maintained under the supervision of the QA Manager. The procedure index shall include all active procedures by number and title and the current revision of each. The plan index shall include all active, controlled plans by title, the current revision of each, and all outstanding Interim Change Notices for each plan. The indexes shall be updated with each status change (i.e., updating revisions, adding newly approved documents, or removing documents determined to be obsolete), and shall include the index issue date. The indexes may be updated by hand on an interim basis, but shall be formally updated at least quarterly. A copy of each issue shall be forwarded to the QA Manager.

Exhibit A

TO: Ottersen, Joey DATE: 07/05/89

FR: GLENN MILLS LOCATION: Seattle

RE: CONTROLLED DOCUMENT TRANSMITTAL / READING TRAINING MEMORANDUM

___v___ ACKNOWLEDGEMENT OF RECEIPT AND TRAINING

Attached is your controlled copy of the referenced document(s). Read each document and destroy any previous revisions in your possession. Please sign below acknowledging receipt and completion of reading training. If you have any questions, contact Glenn Mills at (206) 883-0777.

_____ ACKNOWLEDGEMENT OF RECEIPT

Attached is your controlled copy of the referenced document(s). Please sign below acknowledging receipt. If you have any questions, contact Glenn Mills at (206) 883-0777.

Signature _____ Date _____

DOCUMENT	REVISION LEVEL
P-10.0-1	10

cc: Corporate QA personnel files
Project file

Return signed transmittals to:

GOLDER ASSOCIATES INC.
QUALITY ASSURANCE GROUP
4104 148TH AVE. N.E.
REDMOND, WA 98052

Exhibit B

INTERIM CHANGE NOTICE

Job No._____ ICN No._____

Plan Title _____

_____

Plan Revision_____ Page _____ Section _____

Description of Change:

Approvals

_____ _____
Name Title Date

_____ _____
Name Title Date

_____ _____
Name Title Date

_____ _____
Name Title Date

Please file this Interim Change Notice with your controlled copy of the referenced plan.

Golder Associates

Golder Associates Inc.

Quality Assurance Procedure

Number: P-6.0-1
Title: ENGINEERING DRAWING AND SPECIFICATION CONTROL

Prepared By:	Approved	Approved	Effective Date	Rev. Level
MJ Ottley [illegible] by [signature] 2/2/96	[signature] 2/2/96	[signature] for C.W. LOCKHART 2/2/96	2/2/96	3

RECORD OF REVISIONS

P-6.0-1

Revision Level 3

Page Number	Section	Revision
7	8.7	Added 8.7.1, revised to clarify document storage considerations.

P-6.0-1 Revision Level 3 February 1990
ENGINEERING DRAWING Page 1 of 8
AND SPECIFICATION CONTROL

1. PURPOSE

This procedure describes the standard format, review and approval process, and distribution control methods for Golder Associates Inc., engineering drawings and specifications.

2. APPLICABILITY

This procedure applies to the preparation and control of engineering drawings prepared by both computer-aided and manual drafting techniques, and to engineering specifications.

3. DEFINITIONS

3.1 Engineering Drawing

An engineering drawing is a detailed graphic representation that defines the physical and operational design of a facility, structure, system, or component. An engineering drawing is governed by the requirements of this procedure when one or more of the following criteria are met:

- manufacturing details, views, dimensions, tolerances, or parts lists are provided
- three-dimensional, orthographic, or other representations that provide dimensions or direct instructions, that will be used to control assembly or interfaces with other systems, structures, or components
- the representation is subject to detailed design changes due to changing interface requirements with other systems, structures, or components

Engineering drawing criteria are not intended to apply to geologic maps, conceptual representations, planning documents, textual presentations, or sketches within test plans or test procedures. Review and approval of maps is controlled by procedure P-10.0-2, "Technical Review of Maps". Other representations are reviewed and approved within the context of their parent documents as required by QA procedure P-10.0-1, "Technical Review."

3.2 Engineering Specification

An engineering specification is a controlled document defining the complete design requirements of a system, system element, component, or equipment item. The engineering specification contains all detailed design information as well as technical information required for procurement including requirements for supplier acceptance testing and documentation. It may also contain information relative to handling and storage, shelf life, installation, pre-installation checkout testing, and routine maintenance.

3.3 Computer Aided Design (CAD) System

A computer aided design system is a computer system dedicated to the design and production of detailed graphic presentations, including engineering drawings.

3.4 Drawing/Specification Change Request (DSCR)

A drawing/specification change request is a standard form used to provide the details of a drawing or specification change. The DSCR must be reviewed and approved by the Project Manager, the QA Manager, and designer prior to release. DSCR's are uniquely numbered and, when incorporated, will be referenced in the revision change block on the drawing or first page of the engineering specification.

3.5 Drawing/Specification Transmittal

A drawing/specification transmittal is a standard form issued by the Document Custodian to transmit and confirm receipt of drawings, specifications, or DSCRs.

4. REFERENCES

4.1 Golder Associates QA Procedure P-3.0-2, "Specific Work Instructions"

4.2 Golder Associates QA Procedure P-10.0-1, "Technical Review"

4.3 Golder Associates QA Procedure P-10.0-2, "Technical Review of Maps

4.4 ANSI Y-14.1, "Drawing Sheet Size and Format"

5. DISCUSSION

Golder Associates' engineering drawings and specifications are produced in a standard format that identifies the revision level and approval for each revision, revision history, and project applicability. Once a drawing or specification is formally approved, it is a controlled document and all subsequent changes must be initiated by a Drawing/Specification Change Request (DSCR). Each drawing/specification revision and DSCR must be approved prior to issue. Upon approval, a DSCR is considered part of the controlled drawing/specification to which it applies and work must be performed in accordance with the change.

6. RESPONSIBILITIES

6.1 Project Manager or Designee

The Project Manager (or Designee) is responsible for issuing SWIs which initiate drawing/specification preparation and review activities and for review and approval of drawings/ specifications and changes thereto.

6.2 Designer

The Designer is responsible for developing drawings/specifications based on SWI request, resolving and incorporating review comments, and initiating or approving DSCRs.

6.3 Illustrator

The illustrator is the CAD or drafting technician who is responsible for translating conceptual drawings, design, or other information to reproducible master drawings in the general format indicated herein. The illustrator is also responsible for incorporation of all changes as required by approved DSCR's.

6.4 Document Custodian

The Document Custodian is responsible for maintenance of the drawing/specification issue and control system, issuing Drawing/Specification Transmittals and maintaining controlled storage of the latest approved version of the master drawing and, for drawings prepared using the Computer-Aided Design (CAD) system, magnetic disk or tapes.

6.5 Quality Assurance Manager (or Designee)

The Quality Assurance Manager is responsible for reviewing and approving drawings/specifications and DSCRs.

7. EQUIPMENT OR MATERIALS

None.

8. PROCEDURE

8.1 Preparation and Approval of Master Drawings

The Project Manager initiates the production of a drawing by issuing a Specific Work Instruction (SWI) in accordance with P-3.0-2. The SWI shall assign responsibility for the design, as well as the review and approval of the drawing.

Attachment A is a graphic representation of the drawing preparation, review and approval cycle described below.

8.1.1 Drawing Preparation

Based on SWI request, the drawing designer shall provide conceptual drawings, sketches, or other instructions to the illustrator for the production of preliminary drawings. Drawing content shall meet the requirements identified on the initiating SWI. Level of detail shall be commensurate with the intended use of the drawing. Information such as dimensions, tolerances, parts lists, installation sequences, and other completion or acceptance criteria shall be included as appropriate. When the preliminary drawing is developed to the satisfaction of the designer, it shall be marked "Preliminary Draft", and at the discretion of the designer, circulated for informal comments. Informal comments need not be resolved and may be

incorporated at the designer's discretion. When a draft has been prepared to the satisfaction of the designer, the illustrator and designer shall sign it in the space provided. This draft is considered the review draft.

8.1.2 Review and Approval of Drawings

The draft shall be issued for review as designated on the SWI. Copies for review shall be marked "Review Draft". All reviews shall be conducted in accordance with QA procedure P-10.0-1, Technical Review. As a minimum, a review by the Project Manager and QA Manager (or their designees) is required. The Project Manager may assign additional reviewers based on the complexity of the drawing, system interface requirements, or other concerns. Comments shall be documented on a Review Comment Form (RCF) and marked directly on the review draft by the reviewer. The review draft and RCF shall then be returned to the designer for resolution and comment incorporation. When all review activities are completed, the master drawing shall be routed to the reviewers for approval signatures. If Client approval is required by contract, it shall be obtained after all Golder approval signatures have been applied to the drawing. All SWIs, review drafts and associated RCFs shall be routed to the project files.

8.1.3 Drawing Format

Drawing format and sizes shall be in general accordance with ANSI Y14.1 guidelines, with zone designators and title and revision block layout typically as shown in Attachment B. All drawings shall carry Golder Associates job numbers, Work Breakdown Structure (WBS) numbers if provided by the client, and a project-unique drawing number assigned by the Project Manager. Revision levels shall be uniquely identified by sequential number or letter designations. Revision history shall be incorporated into the drawing in the revision block shown in zone D1/D2 of the example shown in Attachment "B".

8.2 Preparation and Approval of Master Engineering Specifications

The Project Manager initiates the production of a specification by issuing a SWI. The SWI shall assign preparation, as well as review and approval responsibilities.

Attachment C is a graphic representation of the specification preparation and review cycle described below.

8.2.1 Specification Preparation

Based on the scope of the SWI, the designer shall develop a preliminary draft document. Specification content shall meet the requirements identified on the initiating SWI. Level of detail shall be commensurate with the intended use of the specification. Information such as: supplier qualifications; procurement requirements; equipment testing, handling, and storage details; installation and maintenance requirements; and acceptance or completion criteria shall be included as appropriate. The document shall be marked "preliminary draft" and, at the discretion of the designer, shall be circulated for informal comments. Informal comments need not be resolved and may be incorporated at the discretion of the designer. When the specification has been prepared to the satisfaction of the designer, he shall sign the cover sheet in the space provided. This draft of the specification is considered the review draft.

8.2.2 Review and Approval of Specifications

The draft shall be issued for review as designated on the SWI. Copies issued for review shall be marked "Review Draft". All reviews shall be conducted in accordance with QA procedure P-10.0-1, Technical Review. As a minimum, review by the Project Manager and the QA Manager is required. However, the Project Manager may assign additional reviews based on the complexity of the specification, or other concerns. Comments shall be documented on an RCF and marked directly on the review draft by the reviewer. The review draft and the RCF shall then be returned to the designer for resolution and incorporation of comments. When all review activities are complete, the master specification shall be routed to the reviewers for approval signatures. If Client approval is required by contract, it shall be obtained after all Golder approval signatures have been applied to the specification. All SWIs, review drafts and associated RCFs shall be routed to the project files.

8.2.3 Specification Format

The specification cover sheet shall contain, as a minimum, the Golder Associates job number and a project unique specification number assigned by the Project Manager. It shall also contain the revision level, identified by sequential letter or number designators, revision history and approval signatures.

8.3 Drawing/Specification Change Requests

All drawing and specification changes shall be initiated by a Drawing/ Specification Change Request form (DSCR, see Attachment D). Change requests must contain a complete and clear description of the change, in the form of a sketch if appropriate. A DSCR may be initiated by the designer or other project personnel. Each request must be approved by the same groups or individuals who approved the drawing or specification being changed. If the

DSCR was not initiated by the designer, the designer's signature is also required. After the DSCR is approved, it is considered part of the controlled drawing, and work must be performed in accordance with the change.

8.4 Drawing/Specification Revisions

Drawing/specification revisions are the result of approved DSCRs. Drawings/ specifications shall be revised exactly as described on the DSCRs. All incorporated DSCRs shall be noted in the revision block. Changed areas in the drawing/specification shall be marked by a small delta enclosing the new revision level designator. The revised master shall be reviewed and approved in accordance with sections 8.1.2 and 8.2.2 above, by the same groups or individuals who approved the previous revision.

8.5 Issue and Control Requirements

Engineering drawings, specifications and DSCRs are controlled documents and copies shall be marked as such when issued. Unauthorized copies of controlled documents are not permitted. "Information only" copies may be requested through the Document Custodian. An active distribution control system shall be maintained by the Document Custodian to assure that each document holder is issued the appropriate DSCRs and revisions. Base drawings/specifications are issued to personnel as directed by the Project Manager. When revisions or DSCRs occur, the Document Custodian shall issue them to document holders via a Document/Specification Transmittal form (see Attachment E). Document holders shall sign for receipt of the documents and return the Transmittal to the Document Custodian. Superseded drawings, specifications, and DSCRs shall be destroyed or returned to the Document Custodian, with one exception: superseded documents with handwritten working information may be retained only if plainly marked "Superseded - For Information Only".

8.6 Procurement Considerations

All engineering drawings or specifications issued to suppliers or subcontractors shall be controlled as indicated in 8.5. Documents that are included in bid packages are not controlled and will be marked "Information Only." These documents will be upgraded to controlled documents only if a procurement follows bid activity.

8.7 Document Storage

8.7.1 Work in Process

The designer and illustrator are responsible for storage and safekeeping of all work in process. During non-working hours, all work in process shall be protected from damage and tampering; computer disks containing work in process shall be stored in a fire-resistant file room.

8.7.2 Drawing/Specification History File

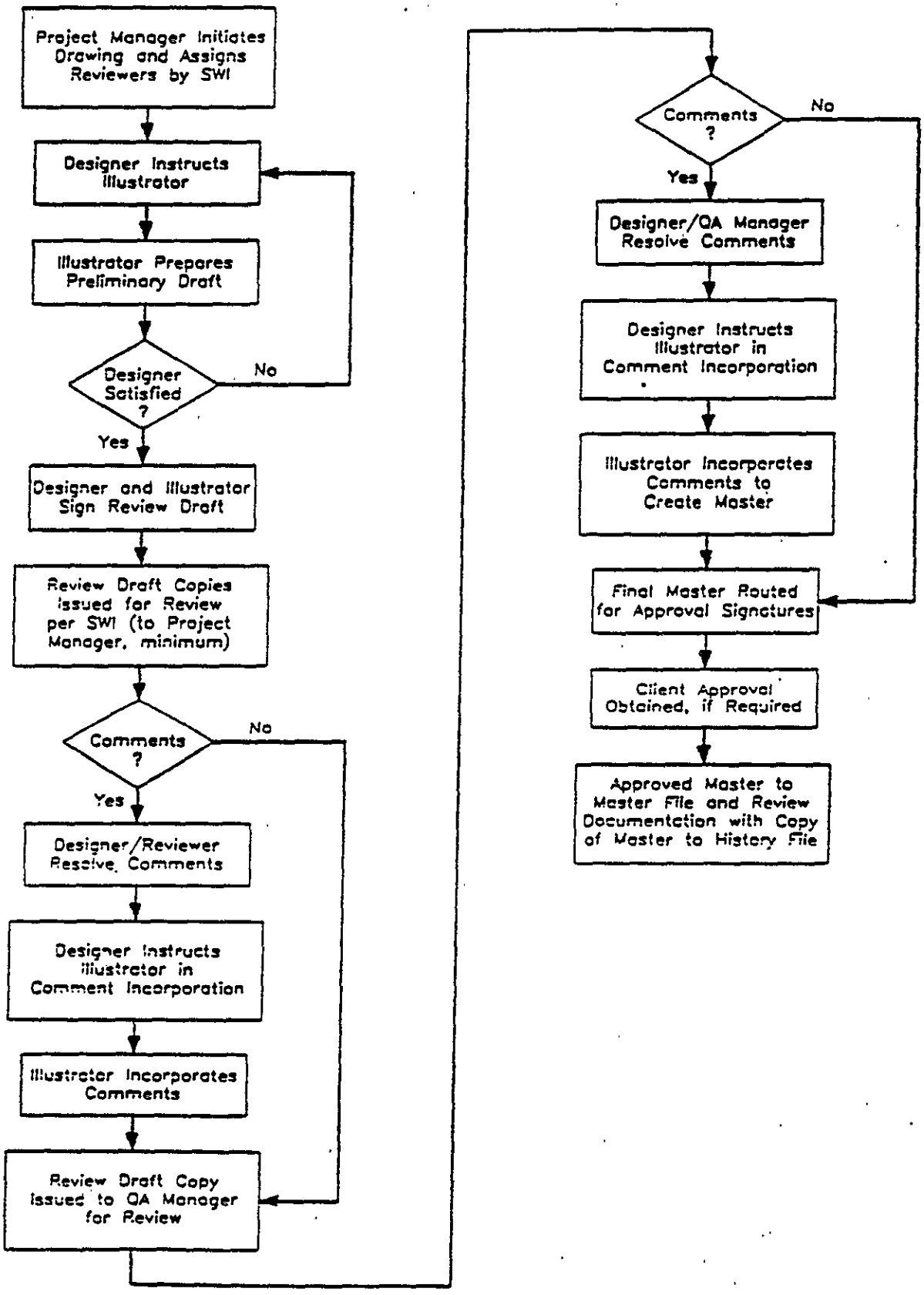
A Drawing/Specification History File shall be established for completed documents within the Project QA Records files. All review documentation shall be stored in the History File, along with a copy of the approved drawing/specification marked "File Copy - For Information Only". A copy of each subsequent DSCR shall also be marked as a file copy and added to the History File. When a DSCR is incorporated, the original shall be marked "incorporated" and filed with the documentation for the drawing/specification into which it was incorporated.

8.7.3 Master File

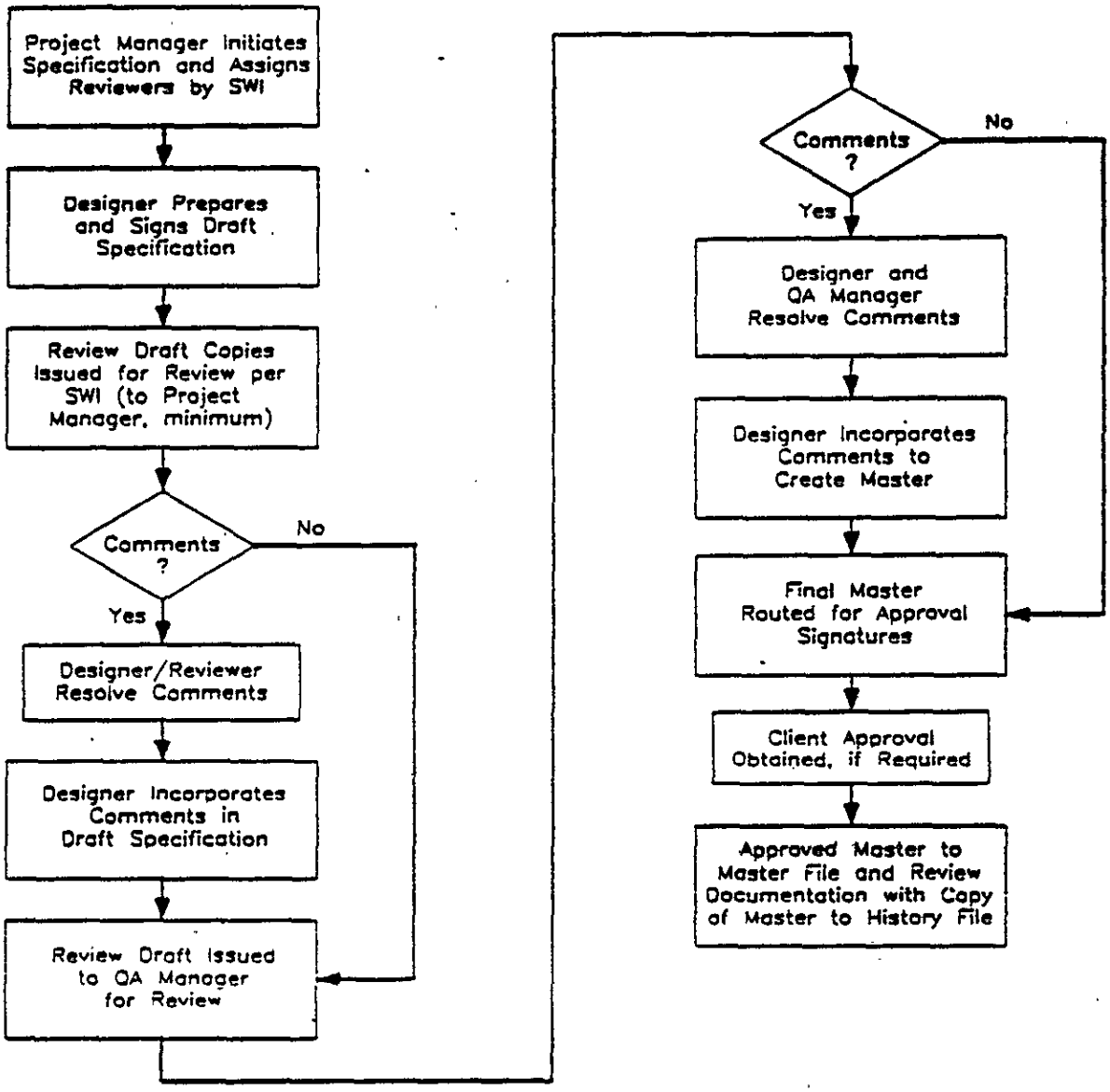
Approved masters, associated magnetic media, if applicable, and outstanding DSCRs shall be stored under the direct control of the Document Custodian in a Master File. The Master File is an active file which shall contain only current drawings/specifications and DSCRs. The Master File shall be the basis for all controlled drawing/specification distribution, and shall be located in an access-controlled fire-resistant file room.

8.8 Master Drawing/Specification List

8.8.1 A master drawing list and a master specification list shall be maintained by the Document Custodian. The lists may be issued on a project-specific basis, or may be all inclusive, but shall include all approved drawings/specifications by number and title, the current revision of each, and the date of drawing or specification approval. The list shall be updated with each status change, (i.e., updating drawing or specification revisions, adding newly approved drawings or specifications, or removing drawings or specifications determined to be obsolete), and shall include the list issue date. Master lists may be updated by hand on an interim basis, but shall be formally updated at least quarterly. A copy of each issue shall be forwarded to the appropriate Project Manager.



LOGIC CHART FOR DRAWING PREPARATION AND APPROVAL
QA PROCEDURE



LOGIC CHART FOR SPECIFICATION PREPARATION AND APPROVAL

QA PROCEDURE

JOB NO. 993-1024 DWG. NO.5650 DRAWN SL APPROVED GM

Golder Associates

DRAWING/SPECIFICATION CHANGE REQUEST DSCR

Page 1 of ____ No.:

Drawing/Spec. No.:____ Revision:____

Project/Task No.:____

Requested by:____

Description of Change:

Approved by:

Project Manager:____ Date:____

QA Manager:____ Date:____

Designer:____ Date:____

Other:____ Date:____

Comments:____

Golder Associates

P-6.0-1 Attachment E

DRAWING/SPECIFICATION TRANSMITTAL

DISTRIBUTED TO: _____ DATE: _____

PROJECT NUMBER: _____

Document Number	Revision	Previous Revision: (Check one) Destroyed	Returned

ACKNOWLEDGED BY HOLDER: (SIGNATURE) _____ DATE: _____

Return to:

Golder Associates Inc.

Quality Assurance Procedure

Number: P-6.0-2
Title: DOCUMENTATION AND CONTROL OF CORRESPONDENCE AND COMMUNICATIONS

Prepared By:	Approved	Approved	Effective Date	Rev. Level
[illegible] 4-3-90	4/4/90		4-3-90	4

RECORD OF REVISION
P-6.0-2
REVISION 4

Page	Section	Revision
1	4	deleted uncited reference
Throughout		editorial

1. PURPOSE

This procedure defines the methods for documenting and controlling all incoming, outgoing and internal correspondence and communications, including the documentation of project-related meetings and telephone conversations.

2. APPLICABILITY

This procedure applies to all project-related incoming and outgoing corresponding or communications. It also applies to all meetings or telecons that may affect project activities in any of the following ways:

- GAI, client, or subcontractor action or response is required.,
- information necessary to the management or the conduct of project activities is transmitted, or
- the scope of project activities is modified

3. DEFINITIONS

None.

4. REFERENCES

None.

4

5. DISCUSSION

All project-related incoming, outgoing, and internal communications and correspondence shall be appropriately documented, distributed, and filed. This requirement applies to all formal communications, such as letters and transmittals, and the documentation of informal communications (such as meeting notes), notes from telephone conversations, and electronic mail (telex or telefax). In all cases the information shall be routed through the appropriate Project Secretary for proper handling, logging, distribution, and filing in the project QA records. All correspondence and records of communications become a part of the project QA records under the controls provided by this procedure.

6. RESPONSIBILITY

6.1 Project Secretary

The Project Secretary is responsible for issuing control numbers for all incoming and outgoing correspondence and communications, logging the communication, copying, and distributing the documents to required individuals and the correspondence project QA files.

6.2 Technical Staff

All technical staff are responsible for documenting project-affecting telephones calls and meetings, and for routing all incoming, outgoing, and internal project correspondence and communications to the Project Secretary for proper handling, and distribution.

7. EQUIPMENT OR MATERIALS

None.

8. PROCEDURE

8.1 Documentation of Telephone Calls and Meetings

All project-affecting telephone calls or informal meetings (as defined in 2.0) shall be documented on a Golder Associates Telecon/Contact Memorandum form (see Exhibit A) or memo to file. The originator shall designate the desired distribution and forward the document to the appropriate Project Secretary for logging, copying, and distribution to all required individuals and the project QA records.

8.2 Routing of Correspondence/Telecons/Meeting Notes

All incoming and outgoing correspondence affecting a project (as defined in 2.0) shall be routed as soon as possible through the appropriate Project Secretary for logging, copying, and distribution to all required individuals and the project QA records. Internal correspondence shall also be routed through the secretary for copying and distribution as appropriate.

8.3 Assignment of Control Numbers and Filing

Unless otherwise directed in individual project QA programs plans, incoming or outgoing letters, telecopier messages, transmittals or project-affecting telecons shall be assigned a unique code number by the Project Secretary. The numbering system shall begin with a project-unique letter designator, as determined by the Project Secretary, followed by sequentially assigned numeric digits. An "I" for incoming and an "O" for outing may also be used to assist with correspondence identification.

8.3.1 The assigned number shall be recorded on the first page of the communication and in the appropriate (incoming or outgoing) communication log. The Project Secretary shall maintain the appropriate logs and sequence of numbers for each type of communication defined in 8.3.2. Several types of communications may be combined in a single log, as long as the retrievability of the information is assured. The logs shall be clearly labeled as to type, and shall be maintained by the Project Secretary.

8.3.2 Files shall be maintained for all of the following types of incoming and outgoing project-related correspondence and communications:

- Letters
- Telecopier/Telex messages
- Telephone Conversations/Informal Meeting Notes (Telecon/Contact memos)
- Transmittals

Golder Associates

TELECON/ CONTACT MEMORANDUM

☐ Personal Visit
☐ Telephone: ☐ Incoming ☐ Outgoing

ROUTE TO:
Files
☐ Project
☐ Business Development
☐ Mailing List

Company Name: _____
Address: _____
_____
Person: _____
Telephone: _____
Job/subject: _____

Job No. _____
Date: _____
Time: _____

Remarks: _____

Action/Next Contact:

_____

BY: _____

CONTROLLED DOCUMENT

Golder Associates Inc.

Quality Assurance Procedure

Number: P-10.0-1
Title: TECHNICAL REVIEW

Prepared By:	Approved	Approved	Effective Date	Rev. Level
[signature] 9-18-90	[signature] 9/18/90	[signature]	9-18-90	-11-

P-10.0-1

Revision Level 11

RECORD OF REVISIONS

Page	Section	Revision Description
Throughout		Completely rewritten

1. PURPOSE

This procedure establishes the requirements for formal evaluation of the technical and quality related aspects of written documents presented to the client as work products or contract deliverables.

2. APPLICABILITY

This procedure is applicable to all Golder Associates Inc. reports, recommendations, test data summaries, procedures, plans, or other technical documents that are produced as contract deliverables. The procedure may also be invoked for other types of documents as required by project specific QA Program Plans, or when specifically requested by management. Typical documents requiring technical review include: project-specific scoping documents, test procedures, and plans; formal review comments related to client or sub-contractor documents; project management plans; project-specific QA Program Plans; letter reports; or any other deliverable document that contains data, evaluations or recommendations.

3. DEFINITIONS

3.1 Author

The author is defined as the individual or individuals responsible for the original writing of the document being reviewed.

3.2 Technical Review

A technical review is an independent, documented, in-depth critical review of a document to verify calculations, examine the applicability and technical adequacy of references and source documents, examine the validity of the technical approach, ensure the completeness and accuracy of data, and to ensure conformance with applicable client requirements, Specific Work Instruction (SWI, see P-3.0-2, "Specific Work Instructions") requirements, and/or any applicable regulatory guidelines. The scope of a technical review may be focused on specific issues or areas of a document as directed by the Project Manager through the SWI process.

3.3 Technical Reviewer

In a technical review, an individual reviewer is assigned the responsibility for independently checking, reviewing, or otherwise verifying that document content is correct and accurate. Reviewers are designated by the Project Manager by means of SWIs. Technical reviewers should have qualifications similar to those of authors, but shall have no direct responsibilities for the production of the document being reviewed. The Project Manager may assume the role of technical reviewer provided that independence requirements are met.

3.4 Mandatory Comment

Mandatory comments in a technical review identify areas in a document that, in the opinion of the reviewer, require a change in order to achieve technical acceptability. Formal resolution of all mandatory comments is required in accordance with the guidelines of this procedure prior to delivery of the document to the client.

3.5 Non-mandatory Comment

A non-mandatory comment is defined as a comment made in a technical review that corrects punctuation, or offers improvements in understanding or corrections of syntax, but does not affect the technical content of the reviewed document. Non-mandatory comments may be documented on the Review Comment Form (RCF; see Attachment A, pages 2 and 3, and Section 3.6 below) if comment discussion is necessary to understanding, or by marking the reviewed text of the document, or both. Non-mandatory comments shall be incorporated at the discretion of the author or authors of the document. Documentation of comment resolution and acceptance is not required for non-mandatory comments.

3.6 Review Comment Form (RCF)

The RCF (see Attachment A, pages 2 and 3) is used for documenting independent technical review activity. When grouped with the associated review and resolution drafts of a document and approved by QA, the RCF provides traceability of all formal mandatory review comments and the comment resolution process.

3.7 Review Draft

The review draft is the version of the document presented by the author or authors for technical review. If calculations are included in the review draft, or required as back up documentation, they shall be evaluated by an independent checker prior to being submitted for review.

3.10 Final Draft

The final draft is the approved updated document with all changes incorporated as a result of the comment resolution process.

4. REFERENCES

Golder Associates Inc. procedures P-3.0-2, "Specific Work Instructions", and P-17.0-1, "Quality Assurance Records Management."

5. DISCUSSION

Technical reviews shall be initiated by the Project Manager by means of SWIs. Each review shall be documented on a Review Comment Form (RCF). All comments recorded on the RCF during review must be categorized by the reviewer as either mandatory or non-mandatory. Non-mandatory comments may be resolved at the author's discretion, and resolution need not be documented on the RCF. All mandatory comments must be formally resolved, and subsequent revisions to the document must be traceable to the comments. Informal review comments may be freely solicited for a document prior to initiation of the review process described by this procedure; however, once the formal review process has started, informal changes to the document are not allowed unless they are purely editorial.

6. RESPONSIBILITIES

6.1 Author or Authors

The author is responsible for:

- producing documents in full compliance with SWI guidelines;
- ensuring that draft documents are as complete as possible prior to entering the review process; and for
- resolving all mandatory comments with technical reviewers, the Project Manager, and/or QA.

6.2 Technical Reviewer

The technical reviewer is responsible for:

- performing critical reviews of documents as directed by governing SWIs and this procedure;
- providing documented mandatory comments and actively participating in the process of resolution as described by this procedure; and for
- providing non-mandatory comments to the author or authors where appropriate for improvements or corrections in syntax, punctuation, or usage.

6.3 Project Manager (or designated representative)

The Project Manager is responsible for:

- initiating document preparation and establishing the scope of technical review activities through the SWI process;
- selecting independent technical reviewers based on qualifications and experience;
- defining any required emphasis or special considerations for individual reviews in the governing SWI;
- ensuring that adequate review time is scheduled to complete the review;
- at the Project Manager's discretion, approving the results of technical reviews and providing additional comments as required; and
- resolving comment resolution conflicts between the author and reviewer.

6.5 QA Manager (or designated representative)

The QA manager is responsible for:

- reviewing and approving the technical review process to verify incorporation or resolution of all mandatory comments; and
- ensuring that applicable QA requirements have been adequately and appropriately addressed.

7. EQUIPMENT OR MATERIALS

Review Comment Forms (RCFs, see Attachment A).

8. PROCEDURE

8.1 Technical Review

Technical review shall be performed as described in the steps listed below:

Step 1: Draft documents shall be completed in accordance with the governing SWI and presented to the independent reviewer designated therein. The reviewer shall either be named on the same SWI or be designated by a separate SWI; the number of the SWI governing the review of the document shall be noted on the RCF form, along with other pertinent information as indicated on page 1 of

Attachment A. If calculations are included in the document, or required as back up documentation, they shall be evaluated by an independent checker prior to initiation of the review cycle. Calculation sheets shall be initialled and dated by both the preparer and the checker, and shall be forwarded to the reviewer along with the review draft.

Step 2: The independent reviewer shall perform a technical review of the draft document. The draft shall be marked "Review Draft" along with the reviewer's name and the review date. The reviewer shall ensure that calculations have been checked, examine the technical approach, evaluate the adequacy of references, evaluate the effectiveness of the use of figures and tables, and perform other review activities appropriate for the type of document, or as specifically directed by the governing SWI.

Step 3: The reviewer shall document all comments on an RCF as described on page 1 of Attachment A. All comments shall be numbered and categorized as mandatory or non-mandatory. Text sections affected by comments shall be numbered in the review draft to correspond with the RCF comments, with the exception that, at the discretion of the reviewer, minor non-mandatory comments that do not require additional explanation or discussion may be marked directly in text without separate treatment on the RCF. The actual review draft shall be retained as part of the project quality records.

Step 4: The reviewer and author shall resolve all of the reviewer's mandatory comments; a concise but complete description of the resolution of each comment shall be recorded on the RCF. All "leave as is" resolutions require rationale. Text sections to be revised should be referenced. The reviewer shall initial each mandatory comment on the RCF to indicate acceptance of the comment resolution prior to word processing update of the document. Non-mandatory comments may be resolved at the author's discretion.

Step 5: The document is updated to include all necessary input for word processing. It is preferred that word processing input resulting from the resolution of comments be marked on a copy (not the original) of the review draft; however, providing none of the reviewer's comments are obliterated, the original review draft may be used for word processing input.

Step 6: The author and the reviewer shall ensure the correct incorporation of comments in the updated draft after word processing. If the document is acceptable, the author and reviewer shall sign the RCF to indicate approval. If, at any time, the reviewer has additional comments, the reviewer must document each comment on the RCF, annotate the original reviewed text accordingly, and review an updated draft prior to signing the RCF.

Step 7: The Project Manager may request involvement in the review cycle by so stating on the SWI initiating the review. If Project Manager involvement is required, the author shall forward the as-reviewed draft, the RCF, and the updated draft to the Project Manager for approval. If the Project Manager has additional comments, they shall be documented on the RCF, categorized as mandatory or non-mandatory and resolved as in Step 4 above. If there are no additional comments, or if the document is acceptable after incorporation of comments, the Project Manager shall sign the RCF to indicate approval. If the Project Manager has not specifically requested involvement in the review cycle via the governing SWI, this step shall be bypassed.

Step 8: The QA Manager (or designee) shall review the review draft, the updated draft, and the RCF for compliance with this procedure and for any special QA concerns. If the review package is acceptable, the RCF shall be signed (Step 10). If the package is not acceptable, Step 9 applies.

Step 9: If QA comments must be resolved, QA shall document comments under the review comment section of the RCF as described in Step 3 above. The RCF shall be routed back to the author who shall resolve the mandatory QA comments. The resolution shall be documented as indicated in Step (4) above. QA shall initial each mandatory comment to indicate acceptance of the resolution, and a corrected draft shall be submitted to word processing for updating.

Step 10: If the document is acceptable after word processing, QA shall sign the accepted RCF. The signed RCF, the original review draft(s), and the final draft shall be retained as permanent quality records. The document may then be released for submittal to the client.

8.2 Quality Records

Documentation supporting the technical review process shall consist of the as-reviewed draft, the final draft, and the completed RCF form. All review documentation shall be routed to project QA files in compliance with P-17.0-1 "Quality Assurance Records Management".

P-10.0-1, Attachment "A", Page 1 of 3
Instructions for Completing RCFs

The instructions listed below correspond to the numbers in the blanks on the example RCF. Personnel responsible for entering the required information on the form are indicated in parentheses.

1) Project Name: (Author) Insert the commonly understood name of the project.

2) Project No.: (Author) Insert the Golder Associates Inc. job and task number.

3) Page: (Reviewers) Pages are consecutively numbered by individual reviewers; total number of pages is added by QA when RCF is finally approved.

4) Document Title: (Author) Insert the document title.

5) Review Date: (Reviewer) Insert the date the review is performed.

6) Author(s): (Author) Identify the author or authors of the document under review.

7) Reviewer(s): (Author) Enter the name of the reviewer, as specified in the governing SWI.

8) SWI No: (Author) Enter the SWI number initiating the review of the document.

9) Comment No.: (Reviewers) Enter the number of each comment, as identified in the reviewed draft.

10) Page, Line, Para.: (Reviewers) Enter the page, paragraph number, and line of each comment.

11) Mandatory/Non-mandatory: (Reviewers) Check the appropriate column for each comment.

12) Review Comment: (Reviewers) Enter the review comment.

13) Comment Resolution: (Author) Enter the resolution of each comment as agreed upon between the author and the reviewer.

14) Resolution Accepted: (Reviewer) Initial and date each resolved comment.

15) Approval: (Authors, Reviewer, Project Manager, QA Reviewer) Sign and date approval in spaces provided.

Golder Associates

REVIEW COMMENT FORM (RCF)

Project Name (1) _____ Project No. (2) _____ Page 1 of (3) _____

Document Title (4) _____ Review Date (5) _____

Author(s) (6) _____ Reviewer (7) _____ SWI No. (8) _____ Rev. _____

Comment No.	Page, Line, Para., Section No.	Mandatory	Non-mandatory	Review Comment	Comment Resolution	Resolution Accepted
(9)	(10)	(11)	(11)	(12)	(13)	(14)

APPROVAL

(15) _____ Author(s) _____ Date	(15) _____ Quality Assurance _____ Date

Golder Associates

RCF CONTINUATION SHEET

Document Title _____ Project No. _____ Page ___ of ___

Reviewer _____ Review Date _____

Comment No.	Page, Line, Para., Section No.	Mandatory	Non-mandatory	Review Comment	Comment Resolution	Resolution Accepted

CONTROLLED DOCUMENT

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

TITLE	EFFECTIVE DATE	REV. LEVEL
P-10.0-3 SURVEILLANCE INSPECTION		-0-
PREPARED BY / APPROVED / APPROVED		
7/14/86 / 7/14/86 / 8/4/86	8-12-86	0
8/10/87 / 8/11/87 / 8/13/87		1
6/9/89 / 6/9/89 / 6/13/89		2

Revision Level	Page No.	Section No.	Revision Made P-10.0-3
2	All	All	Editional corrections throughout to reflect organizational changes, modifications to related procedures.

1.0 PURPOSE

This procedure defines the requirements for conducting surveillance inspections of in-process project activities, including field operations and laboratory testing.

2.0 APPLICABILITY

This procedure shall be used by all Golder Associates Inc. Quality Assurance (QA) personnel requested to perform surveillance inspection of field, laboratory, or other in-process activities requiring compliance with established procedures or methods.

3.0 DEFINITIONS

3.1 Surveillance Inspection: The documented act of monitoring or witnessing the performance of work in process to verify that activities are being conducted in accordance with approved procedures, methods or instructions.

4.0 REFERENCE

4.1 Golder Associates QA Procedure P-15.0-1, "Control of Nonconformances, Incident Reporting, and Corrective Action".

5.0 DISCUSSION

Surveillance inspection is a management tool that may be used during the course of project activities to verify that work in process is being performed in accordance with specified procedures, methods, or instructions. Surveillance inspections are also used to identify and correct both real and potential deficiencies at the earliest possible opportunity to minimize any adverse impacts on the quality and validity of work. The types of activities subject to surveillance inspection include development of procedures, study plans, or other project documents; field activities including instrument installations, testing, and sampling; laboratory activities, including testing and calibration of measurement and test equipment; and subcontractor or consultant activities in any of the areas mentioned above.

6.0 RESPONSIBILITY

6.1 QA Manager: Responsible for establishing surveillance requirements and policies in compliance with client QA requirements and Golder Associates Inc. corporate quality policy. Designates inspection responsibility to qualified personnel who are independent from the work being examined; all designated inspectors are trained in the requirements of this procedures. Responsible for directing the performance of surveillance inspections and when necessary, coordinating schedules with Project Managers, Task Leaders, and Laboratory Managers.

6.2 Designated Inspector: The designated inspector has primary responsibility for conducting surveillance inspections in accordance with this procedure. The designated inspector is responsible for: confirming surveillance inspection schedules with the QA Manager; when appropriate, making detailed arrangements to witness specific portions of an activity; documenting inspection results; reporting of nonconformances; and verifying that corrective actions for dispositioned nonconformances have been properly implemented.

6.3 Project Managers, Task Leaders or Laboratory Managers: Project Managers, Task Leaders, or Laboratory Managers are responsible for coordinating surveillance schedules with QA Manager and the designated inspector. In case of a stop work order, they are responsible for halting operation in a logical and orderly manner that will protect data already obtained, or prevent further damage. They are also responsible for ensuring that corrective actions for dispositioned nonconformances are properly implemented.

7.0 EQUIPMENT OF MATERIALS

Approved QA, technical, testing, or laboratory plans and procedures; project schedules; reference materials as required; Surveillance Inspection Report (SIR) forms (see Exhibit A).

8.0 PROCEDURE

8.1 Surveillance Inspection Scheduling: All project activities, including document preparation, field testing, and laboratory work may be subjected to surveillance inspection at any point during the activity. It is the intent of this procedure that the surveillance inspection be conducted without significantly interfering with the planned course of the activity. Surveillance inspections in no case shall compromise safety considerations or adversely affect the gathering of data. Reasonable advance notice shall be provided to the Project Manager, Task Leader, or Laboratory Manager prior to inspection activities, who shall provide schedule information, procedure documentation, or such other support as may be required. Frequency and scheduling of surveillance inspections shall be determined by the QA Manager based on project schedules, type of activity, and results of past surveillance inspections or audits.

8.2 Inspection Guidelines: At a minimum, surveillance inspection shall verify compliance of the activity with applicable plans, procedures, methods, and Specific Work Instructions.

The following additional items shall be considered during surveillance inspections of laboratory or field testing activities:

- Equipment or instrumentation calibration status and general condition;
- Status or stage of completion of the test or activity must be apparent from test data sheets or logs;

- Test operations and sequencing for the phase of the activity observed must comply with approved procedure requirements;
- The actual starting and stopping times of the surveillance shall be noted on the SIR form;
- Test data sheets and records required by the test plans or procedures must be filled out properly, to the extent necessary for the phase of the test observed.

8.3 Nonconformances and Stop-work Orders: Nonconformances and incidents shall be documented and handled as indicated in procedure P-15.0-1 "Control of Nonconformance, Incident Reports, and Corrective Action." Deficiencies of a minor nature that would not affect a permanent or significant change in quality if not corrected and can be brought into conformance with immediate corrective action shall not be categorized as a nonconformance. If a nonconformance requires stopping work in order to prevent future discrepancies, danger to personnel, loss of data, or similar problems, the designated inspector shall immediately notify the QA Manager, obtain concurrence, and issue stop work instructions. The affected Project Manager, Laboratory Manager, or Task Leader(s) shall be immediately notified.

9.0 RECORDS

9.1 Surveillance Inspection Report (SIR) Forms: An SIR form shall be filled out for each surveillance and routed to the QA Manager for review prior to routing to the project QA records; at a minimum the report shall contain the following information:

- Name of the inspected activity or test, with associated job number,
- Personnel contacted using the surveillance,
- Date and start/stop times of the surveillance,
- References to governing plans or procedures,
- Observations of equipment condition and calibration status,
- General observations and comments,
- NCIR numbers for any nonconformances resulting from the surveillance,
- Discussions of any immediate action taken to correct minor deficiencies or to stop work, and
- Signature of designated inspector and date.

SURVEILLANCE INSPECTION REPORT

SIR

Page 1 of ___

No.:

Inspected Activity or Test: _____

Job Number: _____

Personnel Contacted: _____

Reference Requirements: _____

Insp. Date: _____ Start Time: _____ End Time: _____

Equipment condition/Calibration Status: _____

Observation and Comments (Use Extra Sheets as Required): _____

NCIR Reference (if any): _____

Inspector: _____ Date: _____

Reviewed By:

QA Manager: _____ Date: _____

Comments: _____

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

TITLE	EFFECTIVE DATE	REV. LEVEL
P-10.0-4 RECEIVING INSPECTION		
PREPARED BY / APPROVED / APPROVED		
10-15-87 / 10/20/87 / 10/28/87		1
12-90 / 1/12/90 / 1/12/90		2

RECORD OF REVISIONS
P-10.0-4

Revision Level 2

Page Number	Section	Revision
1	2.0	Revised to allow reference materials to be evaluated per TP-5.1-1 and P-10.0-1 as an option, rather than a requirement
2	6.0	Editorial changes, and clarified QA Manager's involvement
Throughout		Changed "Corporate QA Officer" to "QA Manager"

1.0 PURPOSE

This procedure defines the requirements for receiving inspection of project related materials, and equipment.

2.0 APPLICABILITY

This procedure is applicable to project-related items, materials, and equipment procured for Golder Associates projects which are governed by the requirements of 10 CFR 50, Appendix B as interpreted by ANSI/ASME NQA-1. This procedure is applicable only to procurements directly in support of such projects. As an option, reference materials may be reviewed and evaluated under the requirements of technical procedure TP-5.1.1, "Conducting and Documenting Technical Literature Searches" and QA procedure P-10.0-1, "Technical Review", in lieu of this procedure. 2

3.0 DEFINITIONS

3.1 Receiving Inspection: The documented examination or measurement by an independent party to verify that materials, equipment, or services received conform to procurement specifications.

4.0 REFERENCES

4.1 Golder Associates QA Procedure P-17.0-1 "Quality Assurance Records Management."

4.2 Golder Associates QA Procedure P-15.0-1, Control of Nonconformances, Incident Reports, and Corrective Action."

4.3 10 CFR 50, Appendix B, Sections VII, VIII as interpreted by ANSI/ASME NQA-1.

5.0 DISCUSSION

5.1 The purpose of the receiving inspection function is to assure that items, materials, and equipment from Golder Associates' suppliers conform to the requirements specified in procurement documentation. All items received are to be clearly identified to maintain traceability of supplier documentation to the item procured, and to ensure that only correct items are accepted for use. All nonconforming items, materials or equipment shall be identified and reported in a timely fashion to aid in assuring effective corrective action.

6.0 RESPONSIBILITIES

6.1 Receiving Inspector: The Receiving Inspector is responsible to clearly document the results of all receiving inspections and verify proper identification and marking of all received items, materials, or equipment. Identifies and documents all nonconforming items or supplier documents and is responsible for the physical segregation and identification of these items where possible. The Quality Assurance Manager is responsible for designating and training all receiving inspectors. 2

6.2 Records System Administrator: The Records System Administrator is responsible for the filing, duplication, and maintenance of all completed receiving inspection records and related documentation in accordance with QA procedure P-17.0-1.

6.3 Property Control Administrator: The Property Control Administrator is responsible for the release and retrieval, inventory, and tracking of items, materials, or equipment when property controls are a contractual requirement.

6.4 Project Secretary: The Project Secretary is responsible for the processing of completed receiving inspection records and related documents in accordance with QA procedure P-17.0-1 and distribution to the Property Control Administrator, Records System Administrator, Cost Accounting, and others as determined by project management.

7.0 MATERIALS

- o Quality Assurance acceptance stamp
- o QA accept tag
- o Procurement document(s)
- o Receiving document(s)
- o Nonconformance/Incident Report (NCIR) forms

8.0 PROCEDURE

All project related materials and equipment shall be inspected upon receipt as follows:

8.1 Golder Associates Project Materials and Equipment: Project related equipment and materials shall be inspected at the time of receipt for conformance to procurement document requirements.

8.1.1 At a minimum, the following attributes shall be verified:

- o Dimensions and configuration shall be in accordance with drawings, specifications, or other requirements as referenced in procurement documentation,
- o Test reports, certificates of conformance, calibration and maintenance information or other required supplier documents shall be correct and complete,
- o Identifying label plates, tags, serial numbers, or other markings shall be correct and legible,
- o Preservation, packing, and storage instructions shall be provided if required by procurement documentation,
- o There shall be no visual evidence of damage or deterioration, and
- o Acceptance Testing of received items, when required as a condition of acceptance by procurement documentation, shall be conducted and results documented by the Receiving Inspector. In cases where Acceptance Testing may be performed by a separate testing group, the Receiving Inspector is responsible for coordination and scheduling as required.

8.1.2 Inspection and acceptance of all received items, materials, or equipment will be documented by placement of a QA acceptance stamp (See exhibit A) and date on the receiving invoice or packing slip. All items, materials, or equipment shall be physically identified by attachment of a Golder Associates QA accept tag (See exhibit B). The QA accept tag shall remain attached to the item at least until the item is installed or placed in service. Each item shall be assigned a unique positive identification traceable to the procurement order. These identifiers shall also be noted in the receiving inspection documentation.

8.1.3 A copy of the requesting ordering documents, the original receiving invoice and packing slip shall be forwarded to the Project Secretary for validation and file identification in accordance with QA procedure P-17.0-1. Copies will be distributed to Cost Accounting for initiation of payment activity and to the Record System Administrator for inclusion in the project records.

8.1.4 When property controls are a contractual requirement, the Project Secretary shall provide a copy of the procurement documents with a copy of the QA accepted receiving documents to the project Property Control Administrator. This shall serve as notification of items, materials, or equipment which have been accepted by QA and may be entered into the property control inventory.

8.2 Client/Government Furnished Equipment and Materials: Client Furnished Materials (CFM) and Government Furnished Materials (GFM) shall be inspected at the time of receipt. At a minimum, the following attributes shall be verified:

- o Identifying label plates, tags, serial numbers, or other markings shall be correct and legible, and
- o There shall be no visual evidence of damage or deterioration.

Inspection and acceptance of all CFM and GFM items shall be documented and reported in accordance with the requirements of sections 8.1.2 through 8.1.4.

8.3 Nonconformance Reporting: All items or materials found to be discrepant shall be documented on a Nonconformance/Incident Report (NCIR). The NCIR shall be logged and processed in accordance with QA Procedure P-15.0-1, "Control of Nonconformances, Incident Reports, and Corrective Action." All discrepant items shall be physically segregated from acceptable materials and equipment whenever possible, and clearly identified by attaching a copy of the open NCIR to the item. Discrepant items shall not be released for use or continued processing until all open NCIR items have been resolved.

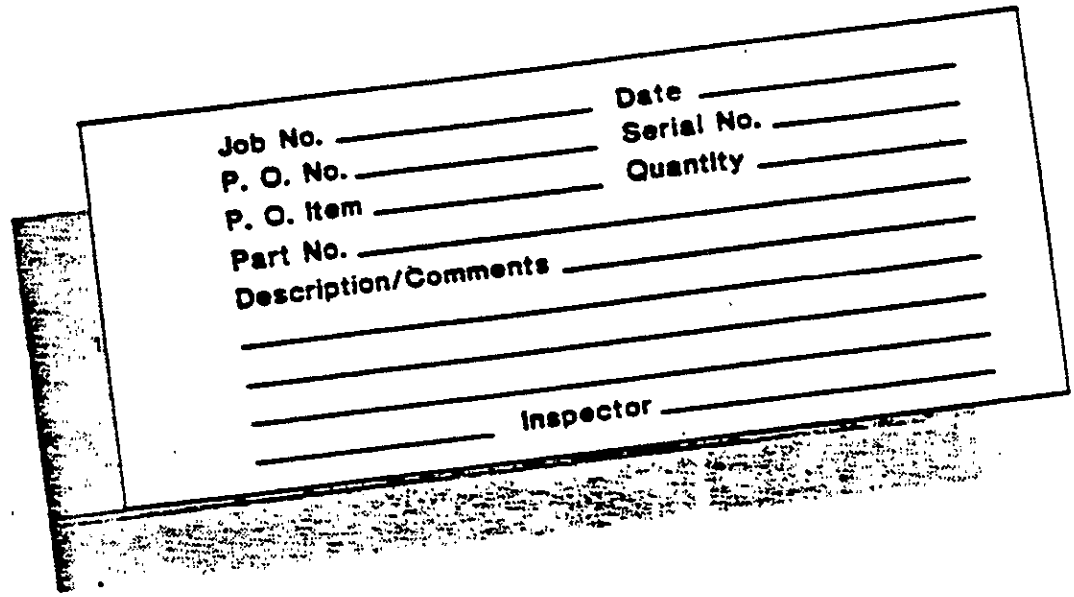
8.4 Inspection Stamp Control: Inspection and acceptance of received items, materials, or equipment shall be verified by use of a Golder Associates QA acceptance stamp (See exhibit A). QA acceptance stamps shall be issued by the QA Manager; each receiving inspector is directly responsible for the control and use of his/her assigned stamp. QA acceptance stamps shall not be loaned, borrowed, or used by unauthorized personnel. In the event of loss, or suspected misuse, the QA Manager shall be notified immediately.

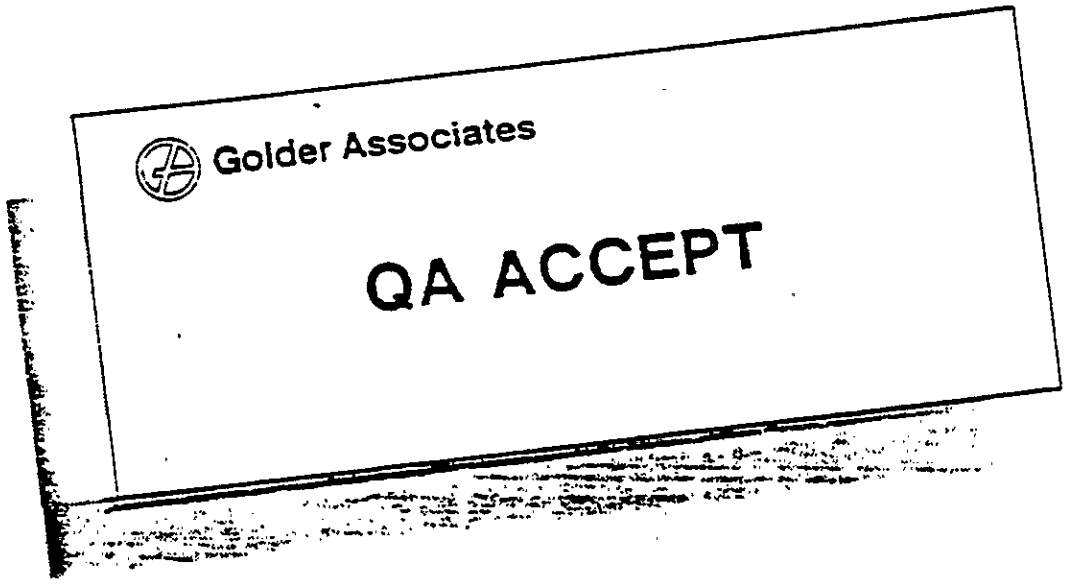
2

Golder Associates
QA Acceptance Stamp

Exhibit A

843-1040-050/1





QA Accept Tag

Exhibit B

843-1040-050/2

CONTROLLED DOCUMENT

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

TITLE P-12.0-1 CALIBRATION AND MAINTENANCE OF MEASURING AND TEST EQUIPMENT			EFFECTIVE DATE	REV. LEVEL
PREPARED BY	APPROVED	APPROVED		
3/24/92	3/27/92	3/24/92	3/24/92	7
1-12-90	1/12/90	1/12/90	1-12-90	8

RECORD OF REVISIONS
P-12.0-1

Revision Level 8

Page Number	Section	Revision
Throughout		Editorial corrections, and changed "Corporate QA Officer" to "QA Manager"
3	6.1	Added condition-found report-related responsibilities
Throughout		Deleted Field Laboratory Manager
3	6.2	Changed "Test Operator or Investigator" to "Field or Laboratory Personnel"
4	8.2	Deleted "lack of use" criterion for extending calibration interval
4	8.3	Added condition-found report requirements
5	8.7	Added requirements regarding damaged equipment
6	8.9	Added requirements regarding calibration-related nonconformances and audit findings

P-12.0-1 Revision Level 8
CALIBRATION AND MAINTENANCE OF MEASURING AND TEST EQUIPMENT

1. PURPOSE

This procedure defines the system to be used for the calibration, control, and maintenance for the calibration, control, and maintenance of measuring and test equipment and calibration standards.

2. APPLICABILITY

This procedure is applicable to all Golder Associates owned or leased measuring and test equipment used in laboratory analyses and field investigations. This procedure is not applicable to standard commercial measurement devices such as rulers, compasses, tape measures, mercury thermometers, or levels, provided that the required level of accuracy does not exceed the limits of the standard equipment.

3. DEFINITIONS

3.1 Calibration

Calibration is defined as periodic comparison of an instrument or measurement device to a standard of known and greater accuracy in order to assure continuity and accuracy of measurements or data. If no standards meeting the requirements of paragraph 3.2 exist, then the basis or justification of calibration method must be documented.

3.2 Calibration Standard

A calibration standard is a device or reference used as a means of comparison for determining quantitatively the accuracy, precision, and repeatability of instruments or measurement devices. Calibration standards must have a traceable, known relationship to nationally recognized standards such as those maintained by the National Institute of Standards and Technology (NIST).

4. REFERENCES

4.1 Golder Associates Quality Assurance Procedure P-18.0-1, "Audits."

4.2 Golder Associates Quality Assurance Procedure P-10.0-3, "Surveillance Inspection."

4.3 Golder Associates Quality Assurance Procedure P-15.0-1, "Control of Nonconformances, Incident Reports, and Corrective Action."

5. DISCUSSION

Calibration and maintenance of instrumentation is required so that the accuracy and precision of data collected, and hence the calculations based on the data, are known. Calibration should not be construed as the instrument adjustments or accuracy checks commonly performed during or as part of test operations, but rather consists of those systematic, periodic evaluations of instrumentation or equipment that verify performance within specified levels of accuracy, precision, and repeatability. Calibration shall be performed in a clean environment, giving due consideration for dust, relative humidity, temperature, and vibration, as necessary for the equipment being calibrated.

Calibration records are normally retained in the laboratory; copies of records specific to certain tests shall be forwarded to project files when requested.

6. RESPONSIBILITIES

6.1 Laboratory Manager

The Laboratory Manager is responsible for the implementation of the calibration and maintenance program within the laboratory. Detailed responsibilities for implementation include:

- Establishment of an identification system by assigning a unique serial number for each piece of equipment in inventory for issuing, tracking, calibration, charge accumulation, use, and recall;
- Provision of calibration and maintenance support to field operations when project size does not permit an onsite calibration facility;
- Assurance of the acceptable calibration status for all equipment, by use of a locator/recall system and calibration status labels prior to releasing for project work;
- Performance or direction of calibration and maintenance activities for all Golder-owned or leased instruments and equipment controlled by a particular Golder office;
- Maintenance and development of the master equipment file, which contains equipment calibration and maintenance instructions, established calibration intervals, and definition of special shipping and handling requirements;

- Maintain suitable storage facilities and instructions for use and care of laboratory standards, separate from other tools and equipment in the calibrated inventory; and

- Review all condition-found reports for equipment found to be out of calibration, and preparation of technical memoranda evaluating the potential effect on measurements made with such instruments over the previous calibration interval.

Specified duties supporting these responsibilities may be delegated to qualified personnel.

6.2 Field or Laboratory Personnel

Equipment users are responsible for verifying acceptable calibration status of all equipment or instrumentation used during a test, and returning such equipment to the Laboratory Manager when recalibration or maintenance is required.

6.3 Project Manager or Task Leader

The Project Manager or Task Leader is responsible for assuring that the equipment or instrumentation procured for or selected for use on a project is of sufficient range, accuracy, tolerance, and construction to provide meaningful data or measurements. In addition, the Project Manager or Task Leader is responsible for assuring that all equipment or instrumentation procured or leased for a particular project is routed through the Laboratory Manager, or for assignment of equipment numbers, entry of information into the equipment file, establishment of calibration interval, and entry into the locator/recall system; and for notifying the Laboratory Manager when client calibration needs exceed existing standards and new requirements must be incorporated into the equipment file.

6.4 QA Manager

The QA Manager is responsible for assuring that procurement documentation for equipment and instrumentation requires manufacturer's documented calibration certification, calibration instructions, maintenance requirements, storage requirements, and special handling requirements; and for scheduling internal audits or surveillances to monitor the effectiveness of the calibration program.

7. EQUIPMENT

Equipment required to implement the provisions of this procedure consists of a file containing calibration procedures and records for all measuring and test equipment, a locator/recall system, and the necessary calibration standards and maintenance tools required by the measuring and test equipment file.

8. PROCEDURE

8.1 Equipment Designation and Tagging

The Laboratory Manager shall assign unique numerical designators to all measuring and test equipment within their respective inventories. Designator assignment should be logical based on the calibration requirements of the instrument or system. If a system component can be used in various applications, the component should be given a unique number. The number should be marked permanently on the equipment. Once calibrated, the equipment shall have a readily visible calibration tag (see Exhibit "A") affixed indicating calibration acceptance, date of last calibration, due date of next calibration, initials of the person performing the calibration, and the equipment number. Equipment calibrated by an outside laboratory shall display the calibration label of that laboratory. In addition, a Golder Associates label will be applied to indicate acceptance in the laboratory tracking and control system. Equipment requiring calibration with each use shall so indicate on the calibration label. This requirement does not apply to equipment normally subjected to adjustments or operational checks before use; such adjustment is not considered calibration as defined in 3.1. Equipment with expired calibration shall be tagged with a red tag indicating "Out of Service" (see Exhibit "A").

8.2 Calibration Interval

The required calibration interval shall be assigned by the Laboratory Manager. In no case shall the calibration interval exceed the maintenance interval. The calibration interval shall be based on manufacturer's recommendations, level of projected use, probable usage environment, and usage history. Laboratory standards shall not be used as measuring or test devices beyond the scope of the calibration function. 8

8.3 Condition-Found Report

Calibration records shall document the as-found calibration status of all equipment. All equipment found to be out of tolerance shall be referred to the laboratory manager for evaluation and preparation of a memo to the equipment file and QA Manager addressing the potential effect on measurements from the previous calibration date. Significant effects shall prompt the initiation of a nonconformance report, which shall be documented and resolved in compliance with P-15.0-1 "Control of Nonconformances, Incident Reports, and Corrective Action." See 8.9 below. 8

8.4 Equipment File

The Laboratory Manager or Field Laboratory Manager shall develop and maintain a comprehensive equipment file which contains, by equipment number, specific calibration instructions, original calibration certifications, calibration intervals, maintenance instructions,

storage requirements, special handling requirements, calibration history (including condition found reports for each calibration), and, if appropriate, reference to the project that it was originally procured against.

8.5 Calibration Sources

Calibration may be performed internally under the direction of the Laboratory Manager, or by qualified external sources. Calibration technique shall be as defined in the Equipment File. Regardless of whether the calibration is performed internally or by an external source, all reference standards shall be traceable to nationally recognized standards. If no standards exist, justification of the calibration method must be a permanent part of the equipment file. Procurement documents for calibration and maintenance services shall require the source to perform the calibration and maintenance to established procedures with traceability to nationally recognized standards. The procurement document shall also require the source to provide a condition-found report and certificates of calibration (and maintenance, if a regular maintenance cycle is required). This documentation shall be reviewed by the Laboratory Manager for compliance with procurement requirements, prior to accepting the equipment into inventory and subsequent release for project use.

8.6 Equipment Tracking and Recall System

The Laboratory Manager is responsible for the maintenance of a system for controlling the issue of equipment, maintaining visibility of equipment location and calibration due dates, and issue of recall notices for recalibration and maintenance. The system may be maintained manually, or may be computerized, but in either case shall initiate recall activity well in advance of the calibration expiration dates in order for test managers to plan for equipment downtime.

8.7 Storage and Special Handling

Storage requirements shall be as specified by the manufacturer or in accordance with accepted industry practice. Equipment and reference calibration standards shall be used only for their intended purposes. They shall be adequately protected from moisture, dust, atmospheric contamination, and physical damage. Calibrated instruments being shipped or transported to field operations shall be securely packaged to prevent damage or loss of calibration due to shock, vibration, extremes of temperature, or moisture. Damaged equipment shall be tagged with a red "Out of Service" tag (see Exhibit A). If the date of equipment damage cannot be determined, the equipment shall be considered out of calibration, and addressed as a nonconformance (see Section 8.9). 8

8.8 Surveillances or Audits

When required by individual project-specific QA program plans or office baseline QA program plans, surveillances or audits shall be conducted periodically to verify compliance with this procedure, per the requirements of procedures P-10.0-3, "Surveillance Inspection" and P-18.0-1, "Audits". Frequency shall be as defined by governing QA program plans.

8.9 Calibration-Related Nonconformances and Audit Findings

When use of equipment with expired calibration, no calibration, or damage is observed in a surveillance inspection, the situation shall be documented as a nonconformance and resolved in compliance with P-15.0-1, "Control of Nonconformances, Incident Reports, and Corrective Action." If like situations are observed in an audit, they shall be documented as audit findings and resolved as required by P-18.0-1, "Audits." In both cases, resolution processes shall include a technical evaluation by the Laboratory Manager of the validity of test results obtained through the use of the equipment since its last calibration date. 8

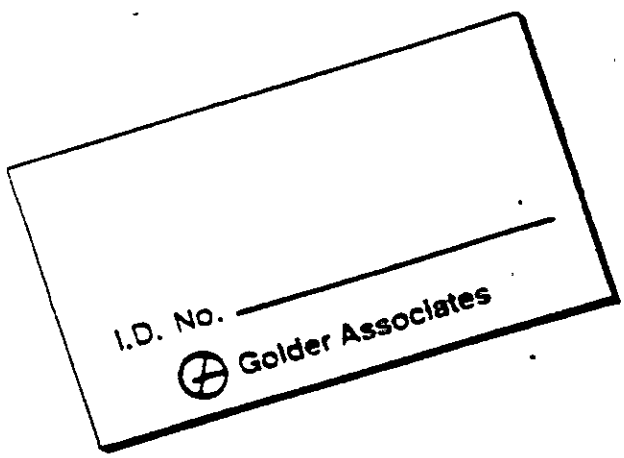


Exhibit A
P-12.0-1

993-1024//10023

CONTROLLED DOCUMENT

Golder Associates Inc.

Technical Procedure

Number: P-15.0-1
Title: CONTROL OF NONCONFORMANCES, INCIDENT REPORTS, AND CORRECTIVE ACTION

Prepared By:	Approved	Approved	Effective Date	Rev. Level
[illegible signature] 6/12/90	[illegible signature] 6/12/90	[illegible signature] 6/22/90		15

RECORD OF REVISIONS

P-15.0-1

Revision Level 15

Page Number	Section	Revision
all	all	minor editorial corrections throughout
4	6.4	changed President to Office Manager
4	7.0	added reference to NCIR forms
6	8.2.2	added discussion of design control measures applicable to dispositioned items. Changed President to Office Manager.
Exhibit B	Exhibit B	corrected C/A section of flow chart.

1. PURPOSE

This procedure establishes a system for the identification and reporting of nonconformances to specified requirements or approved procedures. It provides for identification of causes, disposition, and implementation of corrective action measures to preclude future occurrences. The same basic identification and reporting system is also utilized for the reporting of incidents.

2. APPLICABILITY

This procedure is applicable to nonconforming items, services, or activities that are identified during inspections or reviews, or to incidents that may occur in the field or office.

3. DEFINITIONS

3.1 Nonconformance

A nonconformance is a deficiency in characteristic, documentation, or procedure which renders the quality of material, equipment, services, or activities unacceptable or indeterminate. When the deficiency is of a minor nature, does not effect a permanent or significant change in quality if it is not corrected, and can be brought in conformance with immediate corrective action, it is not categorized as a nonconformance. Such situations might include: technical reviews signed but undated; use of pencil instead of ink; typographical errors in reports. However, if the nature of the condition is such that if it is not corrected it may result in a permanent and significant impact on the quality of the item, test, or report, it must be brought to the attention of the Project Manager and QA Manager (or their designees) for resolution and concurrence on the scope of required corrective action. Examples of nonconformances might include the following: incomplete or inadequate technical reviews; computer programs not verified or validated; testing not in accordance with procedures; sample traceability missing or deficient; sample collection not as prescribed by procedures; use of uncalibrated instrumentation for testing, measurement, or analysis.

3.2 Significant Nonconformance

A reportable nonconformance may be considered significant if it could invalidate the purpose of the activity, or be detrimental to the safety of personnel or public. Examples might be discovery of forged data; catastrophic loss of computerized data for which there is no backup; an improper use of a procedure which has endangered or could endanger others; lack of cooperation in the implementation of corrective action from nonconformances

previously considered reportable; or nonconformances resulting from misapplication, misuse, or non-use of approved test or safety procedures to the extent that the test activity is no longer valid, or personnel safety is endangered.

3.3 Incidents

An incident is defined as any unexpected event during an activity which may have significant impact on project costs, schedule, validity of data or analysis, safety, or environment. Incidents are major events that are clearly not in the category of uncertainties characteristic of geoscientific investigations. Examples might include: major accidents, major equipment failures, fires, earthquakes, cave-ins, or site support failures.

3.4 Disposition

Disposition is defined as the action taken to correct the immediate situation; examples might be. to re-run a portion of a test that was not being conducted in accordance with procedures; to calibrate test equipment found to be out of calibration and re-run any required tests; to re-perform independent technical review; to re-acquire samples; to return defective equipment to the manufacturer for repair or replacement. Item dispositions shall be specified as reject, accept-as-is, repair, or rework as appropriate.

3.5 Reject

"Reject" is an appropriate disposition when a nonconforming item is not acceptable, cannot be repaired such that it performs properly, or reworked such that it complies with the original requirements.

3.6 Accept As-Is

"Accept as-is" is an appropriate disposition when a nonconforming item is determined to perform its intended function properly, even though it does not comply with original requirements. Technical justification for the acceptability of an item dispositioned "accept as-is" shall be documented in the Nonconformance/Incident Report (NCIR).

3.7 Repair

Repair is an appropriate disposition when a nonconforming item can be restored to a condition such that it performs its intended function properly, even though it cannot be brought into compliance with the original requirements. Technical justification for the acceptability of an item dispositioned "repair" shall be documented in the NCIR.

3.8 Rework

Rework is an appropriate disposition when a nonconforming item can be brought into compliance with original requirements by correction or completion.

3.9 Corrective Action

Corrective action is defined as the specific action or actions taken to reduce or preclude the likelihood of future occurrences. Examples might include: revision of procedures for clarity or to resolve conflicting interpretations or instructions; conducting specific training exercises relative to the nonconformance; to redesign faulty equipment; to evaluate and select alternate sources of supply.

4. REFERENCES

Golder Associates QA Procedure P-10.0-3, "Surveillance Inspection"

5. DISCUSSION

All personnel are responsible for reporting possible nonconformances to the QA Department. If determined to be a minor deficiency, the condition may be immediately corrected to the satisfaction of cognizant QA personnel. However, if determined to be a nonconformance, the condition will require full documentation, investigation, disposition, and corrective action. Nonconformances are documented by QA on the Nonconformance/Incident Report (NCIR). The QA Manager and the Project Manager confer to determine the disposition and cause of the condition, and the corrective action necessary to preclude recurrence. If required by contract, the nonconformance is reported to the client. To close the nonconformance, the QA Manager confirms that all required actions have been appropriately completed. Incidents are reported and documented similarly, with the additional requirement of immediate and more detailed reporting to the client.

6. RESPONSIBILITIES

6.1 All Personnel

All personnel shall notify QA representatives when nonconforming conditions are observed; in case of incidents, all personnel are responsible for immediately reporting the situation to both the Project Manager and the QA Manager.

6.2 QA Personnel

QA Personnel performing inspections or reviews have the authorization and responsibility for obtaining immediate corrective action in cases of minor deficiencies, and for initiating nonconformance reports in cases of nonconformance. They are responsible for stopping work when necessary and appropriate and for the physical separation and identification of nonconforming items or documents whenever possible.

6.3 Project Manager and QA Manager

The Project Manager and QA Manager are jointly responsible for reviewing and approving all nonconformances, determining cause, providing disposition and defining the corrective action required to preclude or reduce the likelihood of future occurrences. The QA Manager is responsible for reporting all nonconformances to the client when required by contract. In the case of significant nonconformances and incidents, the Project Manager and QA Manager shall notify their respective client contacts. On a case by case basis, the QA Manager and the Project Manager may delegate responsibility for certain aspects of resolution of nonconformances to the Project or Field QA Coordinator and Project Administrator or cognizant Task Leader.

6.4 Office Manager

The Office Manager acts when necessary to resolve differences between Quality Assurance and Project Management regarding corrective action required as a result of nonconformances.

7. EQUIPMENT OR MATERIALS

NCIR forms (Exhibit A) as required.

8. PROCEDURE

8.1 Handling of Minor Deficiencies

Cognizant QA Personnel shall evaluate apparent deficiencies to determine whether or not a nonconformance exists, given the criteria of 3.1 above. If the situation is minor as defined therein, immediate action may be taken to correct the deficiency and shall be documented on a Surveillance Inspection Record (SIR) form in compliance with P-10.0-3 "Surveillance Inspection." In borderline situations or in any case where there is the least uncertainty, the QA Manager shall be apprised of the situation and shall provide direction as required.

8.2 Handling of Nonconformances

The process for documenting and resolving a nonconformance is described below. A logic chart (Exhibit B) is included which graphically represents this process is included.

8.2.1 Initiation of Nonconformance/Incident Documentation; Stop Work Orders, Identification and Segregation

In cases of nonconformances, cognizant QA personnel will initiate a Nonconformance/Incident Report (NCIR; see Exhibit A). All NCIR forms will be numbered consecutively. A log will be maintained by QA in which the date, NCIR control number, description of nonconformance, project reference and status will be recorded. The situation or discrepancy shall be described on the NCIR in concise, descriptive language, and shall include all appropriate references to documents or procedures. If the situation requires stopping work to prevent further discrepancies, danger to personnel, loss of data, or other problems, the originator of the NCIR shall, after immediately notifying the QA Manager and obtaining concurrence, stop work as required. If work stoppage will affect the scheduled performance of related activities, as in construction or testing, the cognizant Task Leader or Project Manager shall likewise be immediately notified. If the nonconformance is associated with materials, items, or reports, they shall be physically separated or segregated wherever possible and identified with a copy of the open NCIR pending completion of review and disposition.

8.2.2 Review

The NCIR shall be routed to the QA Manager for review; a copy of the initial report shall be retained for tracking purposes; completeness of information will be verified, probable cause will be determined, and recommendations for corrective action will be prepared. The QA Manager then shall meet with the Project Manager; together, they shall jointly agree as to probable cause, disposition, and the corrective action required to preclude recurrence. If nonconformances relate to design requirements, any use as-is or repair dispositions shall require the application of the same design control measures and approvals as was required for the original design. When appropriate, disposition authority may be delegated to personnel technically competent in the applicable area, or additional technical support may be obtained as required. If agreement cannot be reached, the Office Manager shall be consulted for resolution of their differences. The cause, disposition and corrective action shall be documented on the NCIR and a corrective action completion date agreed upon. The QA Manager shall notify the client's QA representative when so required by contract, and advise them that complete documentation will be forwarded upon completion of corrective action. On a case by case basis, or in field situations, the QA Manager and Project Manager may delegate all or portions of the review process.

8.2.3 Corrective Action

Corrective action measures shall be selected to prevent or reduce the likelihood of future occurrences and shall address root causes to the extent identifiable; selected measures shall be appropriate in relation to the seriousness of the nonconformance and shall be realistic in terms of the resources required to implement them. Corrective action instructions are summarized on the NCIR, but shall be communicated in appropriate detail to project staff by the QA Manager and Project Manager (or their designees) by the means most appropriate to the situation. This may be by special corrective action group meetings, training sessions, by individual Specific Work Instructions, by internal memo, or by such other means as may be required to implement the required action. Nonconformances indicative of serious trends or worsening conditions shall require specific detailed reports to management. All such actions shall be documented and will become part of the nonconformance files.

8.2.4 Verification of Effectiveness of Corrective Action

Verification of effectiveness of corrective action shall be as required by individual corrective action instructions. Acceptability of reworked items shall be based on original criteria. Acceptability of repaired items shall be based on criteria equivalent to the original requirements.

8.2.5 Closure

The QA Manager shall confirm that both the disposition and verification of corrective action have been accomplished to his satisfaction. Upon confirmation, the QA Manager shall sign the NCIR for each action. The NCIR shall then be considered closed and the date entered in the log. When required by contract, copies of the NCIR and all supporting information shall be submitted for information to the client's QA organization.

8.3 Significant Nonconformances

Significant nonconformances shall be handled in the same manner as reportable nonconformances except that, when required by contract, they shall require the notification of client QA and Project representatives by the QA Manager and Project Manager.

8.4 Incidents

All personnel with knowledge of an incident are responsible for immediate notification of the Project Manager and QA Manager. NCIR's for incidents shall be prepared in the same manner as those for nonconformances. Upon receiving a report of an incident, the QA Manager will verify that the Project Manager has received the information and, if required, immediately notify the client. Verbal notification must take place within 24 hours; a detailed report will be prepared by the Project Manager and QA Manager and submitted to the client within 14 days. The Project Manager and QA Manager are responsible for resolution of any client requests resulting from the reporting of incidents. If the incident involves Golder Associates' responsibility, formal corrective action reports may be submitted in addition to NCIR forms in order to permit a more detailed level of reporting.

Golder Associates

NONCONFORMANCE/INCIDENT REPORT

Project Client/Title: _____

Project/Task No. _____

Stop Work? ☐ YES ☐ NO

☐ NONCONFORMANCE
☐ SIGNIFICANT
☐ INCIDENT

NCIR NO: _____

DATE: _____

REPORTED BY: _____

_____

CONDITION

Description of Condition (location, time/date of occurrence)	Disposition to Correct Condition

ACCEPT: QA Mgr./Date _____ Proj. Mgr./Date _____ Other _____

CORRECTIVE ACTION

Cause of Condition	Corrective Action Required
	Estimated Completion Date: _____

ACCEPT: QA Mgr./Date _____ Proj. Mgr./Date _____ Other _____

Client Notified by _____ Date _____

Client Re[illegible]

Disposition Complete: QA Mgr./Date _____

P-15.0-1

EXHIBIT A

Golder Associates

NCIR/CONTINUATION SHEET

Continuation of Section _____

NCIR NO. _____

Page ____ of ____

EXAMPLE

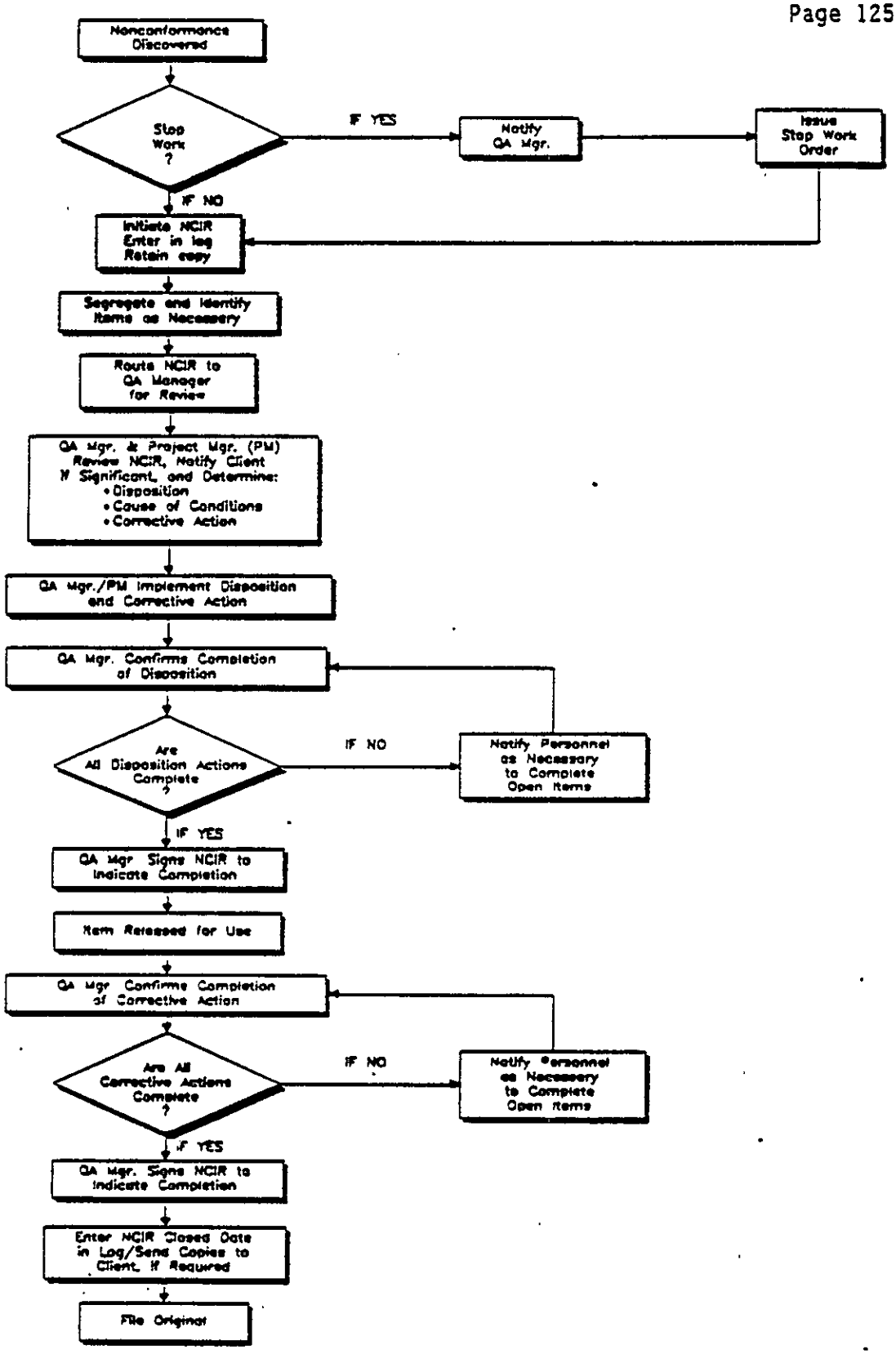


EXHIBIT B
NONCONFORMANCE RESOLUTION
QA PROCEDURE P-15.0-1

PROJECT NO 9931024 DWG NO 33730 DATE 6/11/90 DRAWN JSS APPROVED JO

Golder Associates

Golder Associates Inc.

Quality Assurance Procedure

Number: P-17.0-1
Title: QUALITY ASSURANCE RECORDS MANAGEMENT

Prepared By:	Approved	Approved	Effective Date	Rev. Level
[illegible] 4-2-90	[illegible] 4/3/90	[illegible]	4/3/90	11

RECORDS OF REVISIONS
P-17.01

Revision Level 11

Page Number	Section	Revision
2	4.0	deleted uncited references per P-5.0-1 Rev. 9

1. PURPOSE

This procedure provides the methodology for the collection, storage, maintenance, retrieval and turnover of Quality Assurance (QA) records.

2. APPLICABILITY

When invoked by project-specific plans or procedures, this procedure applies to the management of all completed documents generated within the context of a QA program that provide evidence of the quality of items or activities affecting quality.

3. DEFINITIONS

3.1 Quality Assurance Records

Quality Assurance Records are completed documents which furnish objective evidence of the quality of items or services, those activities affecting quality, or the completeness and quality of data.

3.1.1 Project QA Records

Project QA records are those Quality Assurance records (as defined above) maintained for a specific project. As examples, correspondence, notes of telephone conversations, project deliverables, reports of data obtained in the field, Specific Work Instructions, and technical reviews are considered project QA records.

3.1.2 Duplicate Records

Duplicate records are copies of the project QA records made at the point of file entry and stored separately from the originals as a measure of protection against loss or damage.

3.1.3 Corporate QA Records

Corporate QA records are those records which may generally be drawn upon to support all project QA programs. Such records may include QA and Technical Procedures, QA Program Plans, personnel training records, audit records, and other records for which QA is directly responsible. Corporate QA Records are stored in the corporate QA files. If a client requires certain types of records stored in the corporate QA files as part of the project QA records,

copies will be routed to the project QA files and will be subject to the duplication and storage requirements defined in this procedure.

3.2 Records Index

A records index is an actively updated list of the project or corporate QA records which defines the location of the records within the filing system.

3.3 QA File Center

The QA File Center is a locking, fire resistant room with controlled access in which project QA records are normally stored.

3.4 Archives Facility

The Archives Facility is a controlled access facility separate from the QA File Center in which duplicate project QA records are normally stored.

4. REFERENCES

None.

5. DISCUSSION

This procedure addresses Quality Assurance records, which fall into two categories: QA records maintained for a specific project, and corporate QA records which may be drawn upon to support all project QA programs. A client may require that certain types of corporate QA records be included in the project QA records. In such cases, copies of the corporate records will be routed to the project files, and handled as original project records. Project QA records are reviewed and validated by the Project Secretary prior to filing. Original project QA records are normally stored in the QA File Center. The duplicate files are normally stored in the Archives Facility. Both facilities are under the control of the Records System Administrator. Corporate QA files are stored in a fire resistant, locking cabinet under the control of the QA Manager. Access to records of either type is controlled by a formal checkout system.

6. RESPONSIBILITIES

6.1 Project Manager

The Project Manager is responsible for establishing the basic project structure by dividing project activity into individual tasks, and for providing guidance in the design of the project records index based on the division of tasks.

6.2 Project Secretary

The Project Secretary is responsible for designing the Project Records Index in cooperation with the Records System Administrator, and with guidance from the Project Manager. The Project Secretary is also responsible for providing index changes to the Records System Administrator, and for validating and submitting records for storage.

6.3 Project Personnel

Project personnel are responsible for submitting completed documents to the Project Secretary in a timely manner for validation and forwarding to the project QA files.

6.4 QA Manager (or designee)

The QA Manager is responsible for the maintenance of the corporate QA files and the Corporate Records Index.

6.5 Records System Administrator

The Records System Administrator is responsible for assisting in the design of the Project Records Index with the Project Secretary based on guidance from the Project Manager, and is responsible for the production and maintenance of the Project Records Index, and for storage and control of project QA records files and duplicate files.

7. EQUIPMENT OR MATERIALS

Access-controlled, locking, fire resistant cabinets, access-controlled locking facilities with metal cabinets, and appropriate filing accessories are required to meet the records storage requirements of this procedure.

8. PROCEDURE

8.1 Project QA Records

8.1.1 Project Records Index

At the beginning of each project, a Project Records Index shall be designed which provides the basic structure of the project filing system. The first Index produced identifies the types of records anticipated for the project and assigns a location in the filing system for each type. As the project progresses, the Index is updated to include more and more specific information. The Index shall be designed in a cooperative effort by the Project Secretary and the Records System Administrator. The Project Manager shall provide guidance in the design of the Index based on the project structure and his division of the project activities into job tasks.

As a minimum, the Project Records Index shall include:

- The Golder job number
- The client contract number
- The project title
- A numerical listing of the files
- The title of the file associated with each number. The title shall be specific enough to allow easy retrieval and filing of records.

The Records System Administrator shall produce the Index and update it on a regular basis. The Project Secretary shall provide the Records System Administrator with the information necessary to accurately update the Index. The Records System Administrator shall concur with changes or additions to the Index.

8.1.2 Collection and Validation

Project personnel who generate documents in support of a project shall submit the completed documents to the Project Secretary.

The Project Secretary shall review each document to ensure that it is complete as required by the appropriate QA Procedure, legible, identified with the project number, and contains sufficient information to permit identification between the document and the activity to which it applies. If problems are identified, the document may be returned to the preparer for resolution. The Project Secretary shall also assign a file number to the document based on the Project Records Index. The Project Secretary shall validate each document by

applying a dated records stamp, or by initialing and dating the document. Validated documents shall be forwarded to the Records System Administrator for duplication and filing. At the Project Manager's option, duplication may be performed by support staff. Completed documents awaiting validation and/or entry into the project QA records shall be temporarily stored during non-working hours in a fire-resistant, locking file cabinet, or locking, access-controlled fire-resistant file room.

8.1.3 Duplicate Files

The Records System Administrator shall ensure that a duplicate of each project QA record submitted for filing is produced and properly stored. Duplicate file organization shall be identical to the organization of the original records files. Duplicates shall be stored in binders or folders, in filing cabinets or in containers on shelving. Duplicates shall be stored at a facility which has limited access and is sufficiently removed from the original records to avoid damage or destruction of both sets of files from the same hazardous condition. Normally, duplicates are stored at the Archives Facility. However, when acceptable to the QA Manager and the affected Project Manager, another location may be used provided that the other requirements of this section are met.

8.1.4 Storage Requirements

Project QA records are normally stored in the QA File Center by the Records System Administrator. However, when acceptable to the QA Manager and the Project Manager, records may be stored in another location which has access controls commensurate with those described in paragraph 8.1.5 of this procedure. In either case, records shall be stored in a manner which effectively prevents deterioration or damage from natural disasters or environmental conditions. Records shall be stored in binders, folders, or envelopes in metal cabinets or on shelving in containers. Records files shall be organized separately by project and in accordance with the individual project records index. Special processed records, such as photographs, negatives, and magnetic media shall not be stored in stacks and shall be protected from excessive light, electromagnetic fields, and excessive temperatures and humidity as appropriate for the record type.

8.1.5 QA File Center Access

Access to the QA File Center is limited. The Records System Administrator, with the concurrence of the QA Manager, shall compile a list of personnel allowed direct access to the QA File Center. At least one representative from each project for which records are filed in the Center shall be included on the list. The Project Manager shall designate the project representative. The list shall be posted outside the File Center. All others may gain access only when escorted by an authorized individual, or by permission of the Records System Administrator. The QA File Center shall remain locked when unattended.

8.1.6 Records Retrieval

Individuals may request that files or individual records be retrieved for their use. Requests should be directed to the Records System Administrator. However, any authorized individual (see paragraph 8.1.5) may retrieve records. A formal checkout system shall be used which includes, as a minimum, an outcard to replace the item removed.

8.1.7 Corrections and Revisions

Revisions to records shall be done in accordance with the appropriate QA procedures when applicable. Other corrections shall be made by drawing a single line through the incorrect information and initialing and dating the new entry. Approval of the correction or revision must be equivalent to the level and/or type of approval required for the original information, or as directed by Specific Work Instruction. All corrections and revisions to records checked out of the records files must be brought to the attention of the Records System Administrator to permit appropriate revision of the duplicate files.

8.1.8 Retention Time

All project QA records are considered permanent until turned over to the client or until the close of the contract. After that time, the Project Manager shall determine the disposition of the remaining records unless special direction is provided by the client. Normally, they shall be entered into the Golder archives system.

8.1.9 Records Turnover

Records shall be turned over to the client at their request. Unless otherwise requested by the client, the originals shall be shipped and the duplicates shall remain the property of Golder Associates. Records which have been turned over are the property of the client and maintenance of those records will no longer be considered the responsibility of Golder Associates.

Records to be turned over to the client shall be packaged securely for shipping. Each package of records shall contain an index of the records in that package and shall be clearly labeled as to client, project number, and total number of packages in the shipment. A set of indexes shall be sent to the client under separate cover. Additional requirements may be specified by the client.

8.1.10 Contract Closeout

The date of contract closeout shall be identified by the Project Manager. After this date, records remaining in Golder's possession are no longer subject to the requirements of this procedure. If no records turnover has been requested, and both the duplicate and the original sets remain, the duplicate set may be discarded.

8.2 Corporate QA Records

8.2.1 Corporate Records Index

The Corporate Records Index shall list and provide the location of the records in the corporate QA records files. The QA Manager shall ensure that the index is updated as necessary to reflect changes.

8.2.2 Storage Requirements

Corporate QA records are stored in a locking, fire resistant file cabinet.

8.2.3 Corporate QA Records Access

Access to corporate QA records is by permission of the QA Manager or his designee. A list of personnel allowed access to the files shall be posted on the cabinet.

8.2.4 Retention Time

The following records, as a minimum, shall be retained in the corporate QA files:

- Correspondence from both the current and previous year
- Personnel records for current Golder employees and current subcontractors
- Current revision of each procedure and each QA Plan.

Other records may be transferred to the Golder Archives at the discretion of the QA Manager. Transferred records are no longer subject to the requirements of this procedure. The current contents of the corporate QA files shall be clearly identified on the Corporate Records Index.

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

TITLE P-18.0-1 QUALITY ASSURANCE AUDITS	EFFECTIVE DATE	REV. LEVEL
PREPARED BY / APPROVED / APPROVED	3/31/88	12

RECORD OF REVISION

Revision Level	Page Number	Section Number	Revision P-18.0-1
12	4	8.1	Clarified audit schedule review requirements
12	6	8.6	Added statement re: notification of situations requiring immediate CA
12	6	8.8	Clarified audit report content requirements
12	8	9.0	Clarified audit record requirements
12	Throughout		Changed "Corporate QA Officer" to "QA Manager"

1. PURPOSE

The purpose of this procedure is to establish methodology and general guidance for Quality Assurance (QA) audits performed by Golder Associates personnel.

2. APPLICABILITY

This procedure applies to all Golder Associates QA audits of internal and subcontracted project activities.

3. DEFINITIONS

3.1 Quality Assurance Audit

A planned and documented investigation performed in accordance with written procedures or checklists for the purposes of verification, by examination and evaluation of objective evidence, that applicable elements of a Quality Assurance program have been developed, documented, and effectively implemented in accordance with specified requirements.

3.2 Lead Auditor

A qualified, and certified individual authorized to organize and direct audits, report findings, and evaluate corrective action. Lead Auditors shall be trained, qualified and certified as required by procedure P-18.0-2, "Auditor Qualification."

3.3 Auditor

A qualified and trained individual authorized to perform audit functions under the direction of a Lead Auditor. Auditors shall be qualified and trained as required by procedure P-18.0-2, "Auditor Qualification."

3.4 Technical Observer

An audit team member assigned to observe audit activities under the direction of the Lead Auditor. At the Lead Auditor's discretion, technical observers may be requested to participate in areas of an audit for which they have particular technical expertise.

3.5 External Audit

An audit of the QA program of a subcontractor, supplier, consultant, or other external organization.

3.6 Internal Audit

An audit of those portions of a Quality Assurance program controlled by and within Golder Associates' own organizational structure.

3.7 Finding

A deficiency or lack of compliance with any element of the QA program which renders the quality of items, services, or activities unacceptable or indeterminate. All findings must be formally resolved to assure effective correction of the observed condition and the adoption of preventive measures to reduce or preclude the likelihood of recurrence.

3.8 Observation

A weakness in a program or practice that could lead to a more serious deficiency or finding if not corrected. Although not necessarily constituting a lack of compliance or affecting quality, all observations must be formally resolved to assure effective correction of the observed condition and the adoption of preventive measures to reduce or preclude the likelihood of recurrence.

3.9 Management Assessment

An independent, annual assessment of the overall effectiveness of the QA program by a representative of Golder Associates upper management familiar with the scope of contractual QA requirements and Golder Associates' QA program. The assessment is documented by means of a report that is presented to the President of Golder Associates, the Principal-in-Charge, and the QA Manager.

4. REFERENCES

4.1 Golder Associates Quality Assurance Manual, Section 18.0, "Quality Audits."

4.2 Golder Associates Quality Assurance Procedure P-18.0-2, "Auditor Qualification."

4.3 10 CFR 50, Appendix B, Section XVIII, as interpreted by ANSI/ASME NQA-1.

5. DISCUSSION

QA audits are performed periodically on internal or subcontracted project activities to verify project performance relative to established quality requirements and to provide management information on the effectiveness of project QA programs. Auditing is a positive activity, which has as its

ultimate goal the improvement or enhancement of project performance. QA audits are independent, formal processes with strict rules of conduct and protocol designed to assure the impartiality and usefulness of the results. Auditor and technical observer selection is based on experience, training, and functional independence from the organization or group being audited. The activities of auditors and observers are directed by a trained and qualified Lead Auditor who has primary responsibility for audit planning, conduct, reporting of results, and monitoring the effectiveness of corrective action. The effectiveness of the auditing program itself is evaluated by an annual independent management assessment.

6. RESPONSIBILITIES

6.1 QA Manager

Responsible for establishing audit schedules in project-specific QA Program Plans. Responsible for selection of Lead Auditors who are functionally independent from audited organizations. In conjunction with the Lead Auditor, reviews and approves audit plans and reports prior to release. Responsible for preparation of an annual report to management on the previous year's audit activity.

6.2 Lead Auditor

Responsible for the organization and direction of audits; selection and supervision of auditors and technical observers functionally independent from the organization or group being audited; and the evaluation of observations and findings. In conjunction with the QA Manager, reviews and approves audit plans and reports prior to release. Presents audit results to project management and evaluates corrective action responses.

6.3 Auditor

Under the direction of the Lead Auditor, responsible for assisting in audit preparation, conduct, and report preparations.

6.4 Technical Observer

At the direction of the Lead Auditor, responsible for assisting in audit preparation and conduct in selected audit areas.

6.5 Audited Organization

Responsible for the provision of time, workspace, and availability of personnel as necessary to support the performance of the audit. Responsible for the effective resolution of audit findings and observations.

7. REQUIRED MATERIALS OR DOCUMENTS

- Notification letter or memorandum
- Audit plan
- Pre- and post-audit attendance sheets
- Audit checklists (see Exhibit A)
- Reference plans or procedures
- Audit Quality Notices (see Exhibit B)

8. PROCEDURE

8.1 Audit Scheduling

QA audits shall be conducted in accordance with schedules contained within individual Project Specific QA Program Plans. Audit frequency shall be based on the scope, level of activity, and complexity of the project as well as the number of personnel assigned, specific client requirements, and other factors. Schedules presented in each QA Program Plan shall be considered minimum requirements, and shall be periodically reviewed and revised to accommodate changing project requirements. Audit frequency may be increased at the discretion of the QA Manager or when requested by management. 12

8.2 Audit Plan Preparation

The Lead Auditor shall be responsible for preparation of an audit plan. The audit plan shall be approved by both the Lead Auditor and QA Manager, and shall include the following:

- The source of the requirement for conducting the audit
- The audit number (consecutive on a calendar year basis)
- Identification of the audited organization
- The specific project, tasks or activities being audited
- A discussion of any special emphasis or focus
- Specific plan, procedures, or requirement references
- The prospective date(s) of the audit

- Identification of the audit team, with definition of audit responsibilities.

Audit team selection shall be based on team member independence from the organization being audited. Technical observers may be selected if, in the opinion of the Lead Auditor, a particular type of expertise would enhance audit effectiveness. Audit files and nonconformance records for the audited organization shall be reviewed for trends or repetitive problems. Existence of such conditions shall prompt the re-examination of problem areas.

8.3 Audit Notification

The Lead Auditor shall transmit a memo or letter of notification transmitting the audit plan to the prospective auditee at least two weeks prior to the projected audit date. The notification letter or memo shall set the date, time, and location of the opening meeting, request that appropriate personnel from the audited organization be in attendance, and, for external audits, request separate working space for the audit team to work in during the course of the audit.

8.4 Audit Checklist Preparation

Lead Auditors shall be responsible for directing the preparation of the audit checklist. Checklist format is provided as Exhibit A. Auditors or technical observers may be assigned the preparation of checklist sections, particularly in areas for which they will assume auditing responsibilities. The checklist shall be reviewed and approved by the Lead Auditor and the QA Manager. Approval shall be indicated by signature and date on sheet of the checklist.

Checklist content shall be consistent with the scope of the audit presented in the Audit Plan; checklist items shall be structured in question format and shall directly relate to the procedure and plan requirements applicable to the audited area. As much as possible, questions should focus the inquiry towards an evaluation of the effectiveness of implementation of plan and procedure requirements.

Copies of the checklist, the audit plan, and any required reference specifications, procedures, or plans shall be distributed to the audit team prior to the audit. The Lead Auditor shall brief the audit team on the general scope of the audit, the details of the audit plan, and discuss audit checklist assignments prior to the pre-audit meeting.

8.5 Pre-audit Meeting

The preaudit meeting shall be conducted by the Lead Auditor and shall be attended by the audit team and appropriate representatives of the audited organization. Attendance shall be documented. The scope of the audit and duties of the auditors or any technical observers shall be briefly presented.

Questions from the audited organization shall be answered, proper lines of communication established, and a time set for the closeout meeting.

8.6 Conducting the Audit Investigation

Each auditor should proceed with the investigations required on their assigned portion of the checklist. Auditing techniques should include records review, interviews with project staff, and direct observation of project activities. Personnel interviewed shall be noted in the response column on the checklist. When evaluating similar items of information, a sufficiently large sample shall be selected to support any conclusions. The audit team shall meet and report on audit progress at the direction of the Lead Auditor. Observed conditions that require immediate corrective action shall be promptly reported to the management of the audited organization; in any case, daily briefings shall be given to the audited organization at their option. The Lead Auditor may restructure the audit in terms of emphasis and auditor assignment as required to accommodate changes to the audit plan or checklist required as a result of information obtained during the audit. Demand on project resources and time should not be increased beyond the level presented in the opening meeting without first clearing such requests with the management of the audited organization.

8.7 Post-Audit Meeting

When all checklist items have been completed, the audit team shall meet and present their potential findings, or observations to the Lead Auditor. The Lead Auditor shall review the auditors' input, obtain additional clarification where required, and prepare a draft list of potential findings and observations for presentation to representatives of the audited organization in a post-audit meeting. Discussion should be limited to the presentation of findings and observations and the resolution of any errors or misunderstandings. Audited personnel shall be advised that a written report will be forthcoming with full details of any findings or observations. Attendance shall be documented.

8.8 Audit Report Preparation

After the post-audit meeting, the auditors shall prepare final copies of their completed checklist sections and submit them to the Lead Auditor. The Lead Auditor shall document each finding or observation on an Audit Quality Notice (AQN, see Exhibit B) and shall prepare a formal audit report in the form of a memo or letter to the management of the audited organization. The report shall include the following:

- A brief description of the audit scope
- Identification of the audit team and all personnel contacted from the audited organization

- A general statement of effectiveness
- Discussion of all findings, observations, and comments

The audit report shall formally transmit any AQNs, which shall contain sufficient detail to permit effective corrective action responses. All AQNs shall require response by the audited organization regarding its proposed corrective action within fifteen working days after receipt. The report shall be reviewed, approved, and countersigned by the QA Manager prior to transmittal.

8.9 Determination of Cause and Proposed Corrective Action

The audited organization shall respond to the AQNs in the time specified. The deficiency shall be investigated and the cause determined and documented on the AQN; the description of cause must address the basic source of the problem. Proposed corrective action must address the possibility of similar problems outside the audited sample, and, considering the source or cause of the problem, must be capable of implementation at an effective level.

8.10 Review of AQN Responses and Audit Closeout

The Lead Auditor shall evaluate responses from the audited organization to assure that the proposed corrective action for each finding or observation has been adequately addressed. In some cases, corrective action may require reassignment to other groups for the corrective action to be considered effective. (In cases in which corrective action responsibilities lead back to the Lead Auditor's organization, the proposed corrective action on the AQN must be reviewed by an independent management representative familiar with the auditing process to assure the appropriateness of the response. The same management representative must countersign the AQN upon closeout.) The Lead Auditor shall initiate a letter or memorandum to inform the audited organization and the QA Manager of the acceptance or rejection of audit responses. Memoranda indicating acceptance must identify any conditions that must be verified prior to audit closeout. Methods of verification of corrective action may include direct examination, reaudit, interview, or other appropriate means selected by the Lead Auditor. Memoranda indicating rejections must contain sufficient detail to redirect the auditee and establish a new response due date. The Lead Auditor or a designated audit team member shall actively track the resolution of observations or findings until closeout. The Lead Auditor and the QA Manager must concur on the closeout of all findings and observations.

8.11 Management Assessments

An independent management assessment of the overall implementation of QA program requirements on projects requiring QA Program Plans shall be conducted at least once annually to provide upper management independent evaluations of the effectiveness of all elements of the QA program including auditing. Such

assessments may be performed by outside consultants with appropriate expertise or by senior management officials; assessments shall be documented in letter or memo format and forwarded to the President, Principal-in-charge, and QA Manager. The QA Manager shall be responsible for any required corrective action resulting from management assessments.

9. RECORDS

Audit records shall be retained as follows:

- Corporate QA Records: Notification letter or memorandum, pre- and post-audit attendance sheets, audit plan, completed checklist, audit report letter or memorandum, completed and closed AQNs (with any additional related responses from the audited organization attached), and, in a separate file, independent management assessments. 12

- Project QA Records: Same as above, less completed checklists and management assessment documentation, with transmittal letters if required for informational submittals to the client by the QA Program Plan.

A.0-1
Exhibit A

GOLDER ASSOCIATES
QA AUDIT CHECKLIST

Page ____ of ____

Approved by _____ _____ Approval Date _____
Lead Auditor Quality Assurance Officer

Audit Number _____ Date _____ Audited Organization _____ Auditor _____

QUESTION	REFERENCE REQUIREMENT	RESPONSE

EXAMPLE

P-18.0-1
Exhibit B

GOLDER ASSOCIATES, INC.
AUDIT QUALITY NOTICE (AQN)

1. TO:_____ 4. FROM:_____

2. ORGANIZATION:_____ 5. AQN NUMBER:_____

3. COMPANY OR PROJECT:_____ 6. TYPE OF NOTICE:_____

___ FINDING ___ OBSERVATION

7. DESCRIPTION OF REQUIREMENT:_____

8. DISCUSSION OF CONDITION REQUIRING CORRECTIVE ACTION:_____

9. DISCUSSED WITH:_____ DATE:_____

10. AUDITED ORGANIZATION TO COMPLETE THE FOLLOWING ITEMS AND RETURN TO GAI QA BY:_____

11. PROPOSED CORRECTIVE ACTION; LIST FUNDAMENTAL BASIS FOR DEFICIENCY AND ACTION TO BE TAKEN TO PREVENT RECURRENCE:_____

12. COMPLETION SCHEDULED BY:_____
DATE

13. RESPONSIBLE FOR CORRECTIVE ACTION:_____
DATE

CLOSEOUT

14. CLOSED BY:_____ 15. APPROVED BY:_____
LEAD AUDITOR GAI QA MANAGER

DATE CLOSED:_____ DATE APPROVED:_____

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

CONTROLLED DOCUMENT

TITLE	EFFECTIVE DATE	REV. LEVEL
P-18.0-2 AUDITOR QUALIFICATION		
PREPARED BY / APPROVED / APPROVED	3/31/88	4

Revision Level	Page Number	Section Number	Revision P-18.0-2
4	Throughout		Changed "Corporate QA Officer" to "QA Manager"
4	3	8.1.2	Clarified qualification lapse definition
4	3	8.1.3	Clarified certification responsibilities if Lead Auditor is also QA Manager
4	4	8.2.2	Clarified preaudit discussion content
4	5	8.3.3	Defined responsibilities for maintenance of audit log
Exhibit A			Added second certification block

P-18.0-2 Revision Level 4 March 1988
AUDITOR QUALIFICATION Page 1 of 5

1. PURPOSE

This procedure defines the requirements for the qualification, training, and orientation of Golder Associates' Quality Assurance (QA) auditors, lead auditors, and technical observers.

2. APPLICABILITY

This procedure applies to all Golder Associates' QA auditors, lead auditors, and technical observers performing audit functions under the requirements of procedure P-18.0-1, "Quality Assurance Audits."

3. DEFINITIONS

3.1 Quality Assurance Audit

A planned and documented investigation performed in accordance with written procedures or checklists to verify, by examination and evaluation of objective evidence, that applicable elements of a QA program have been developed, documented, and effectively implemented in accordance with specified requirements.

3.2 Lead Auditor

A qualified individual, certified by Golder Associates' management, who is authorized to organize and direct audits, report findings, and evaluate corrective action.

3.3 Auditor

A qualified and trained individual authorized to perform audit functions under the direction of a lead auditor.

3.4 Technical Observer

An audit team member assigned to observe audit activities under the direction of the lead auditor. At the lead auditor's discretion, technical observers may be requested to participate as an auditor in areas of the audit for which they have particular technical expertise.

4. REFERENCES

4.1 ANSI/ASME NQA-1, Basic Requirement 18, Supplement 2S-3, and Appendix 2A-3.

4.2 Golder Associates QA Procedure P-18.0-1, "Audits."

5. DISCUSSION

All QA audit functions shall be performed by qualified lead auditors, auditors, or technical observers who are independent from direct responsibility for the activities being audited. Qualification of auditors and technical observers shall be based on appropriate work experience and on audit-specific training and guidance provided by the lead auditor. Lead auditors shall be experienced in the auditing process, and, by virtue of passing a comprehensive examination, shall have demonstrated knowledge of 10 CFR 50 Appendix B, ANSI/ASME NQA-1, general requirements of QA programs, evaluative auditing techniques, and audit planning and execution.

6. RESPONSIBILITIES

6.1 Lead Auditor

Responsible for selection of the audit team; trains newly assigned auditors or technical observers in the requirements of procedure P-18.0-1 and provides general background in the provisions of 10 CFR 50 Appendix B, ANSI/ASME NQA-1, and Golder Associates QA program. Responsible for providing direction to the audit team in the requirements of individually assigned checklist sections and any referenced plans or procedures.

6.2 QA Manager

Responsible for the certification of lead auditors in conjunction with the Office Manager.

6.3 Office Manager

Responsible for the certification of lead auditors in conjunction with the QA Manager.

7. MATERIALS

- Lead Auditor Qualification Record (Exhibit A)

8. PROCEDURE

8.1 Lead Auditor Qualification Requirements

8.1.1 Basic Requirements

Lead auditors shall possess the oral and verbal communication skills necessary to effectively conduct an audit. By written examination, they shall have demonstrated their knowledge of the applicable regulatory guidelines and standards, the general requirements of QA programs, appropriate auditing techniques, and the methods of audit planning. Lead auditors shall have participated in at least five (5) previous audits in the three years prior to certification, one of which, in the last year prior to certification, shall have been conducted on a program for which 10 CFR 50 Appendix B was a regulatory requirement. Lead auditors shall have additional technical and/or QA related experience totalling at least ten (10) points as required by the Lead Auditor Qualification Record (Exhibit A). Qualification points shall be assigned in accordance with the guidelines provided in paragraphs 2.1, 2.2, 2.3, and 2.4 of Appendix 2A-3, ANSI/ASME NQA-1.

8.1.2 Maintenance of Qualification and Requalification

Lead auditor performance shall be assessed on an annual basis to assure continued facility with the auditing process and P-18.0-1 requirements. Qualification may be maintained by continued active work assignment within the QA organization, participation in an audit training program, or by active participation in the audit process. In any case, in order to maintain qualification, at least once every two years a lead auditor must lead or participate in an audit conducted in accordance with procedure P-18.0-1. If qualification should lapse, the QA Manager and the Office Manager shall assess the circumstances requiring requalification. Retraining may be required if warranted, but in all cases the candidate shall be re-examined as described in 8.1.1 above, and shall participate in at least one nuclear level audit under the direction of a certified lead auditor.

8.1.3 Certification

The branch Office Manager and QA Manager will certify individuals as lead auditors when the basic qualification requirements are met as defined in 8.1.1 above, except that if the QA Manager is also the candidate for certification, the Office Manager alone shall certify. Lead auditors will be recertified on an annual basis provided that the maintenance requirements defined in 8.1.2 are met and documented. Lead auditors whose qualifications have lapsed will be recertified only when the requalification requirements described in 8.1.2 have been completed.

8.2 Auditor and Technical Observer Qualification Requirements

8.2.1 Experience Requirements

Auditors shall have at least 2 years geotechnical, nuclear industry, or QA background; auditors and technical observers shall have at least six months' experience working under Golder Associates' (or similar) QA program. Technical observers assigned audit duties shall have expertise in the assigned area as documented by corporate resume. In exceptional circumstances (for example, a situation in which a potential observer or auditor has a particularly useful technical expertise but is an independent consultant or has just recently joined the company), experience requirements for a particular individual may be waived by the lead auditor for a particular audit; written justification shall be retained on file, however, and the training and orientation required by 8.2.2 given additional emphasis.

8.2.2 Qualification of Auditors and Technical Observers

Auditors and technical observers shall participate in a preaudit orientation meeting led by the lead auditor. In addition to discussing the detailed scope of the audit to be performed, the lead auditor shall provide newly assigned auditors and observers instruction in the provisions of 10 CFR 50 Appendix B, ANSI/ASME NQA-1, proper auditing technique, and the provisions of Golder Associates' QA procedure P-18.0-1, "Audits." Regardless of previous experience, all auditors or observers shall be briefed in the requirements of their assigned checklist sections and in the provisions of any referenced plans or procedures.

8.3 Qualification Documentation Requirements

8.3.1 Lead Auditor Qualification Documentation

If performed internally, lead auditor examinations shall be retained in confidential personnel files. Successful examination completion, assessment of communications skills, experience, credentials, certification, and annual evaluation shall be documented on the Lead Auditor Qualification Record (Exhibit A) and retained in corporate QA personnel files. Qualification points shall be assigned for experience as discussed in paragraphs 2.1, 2.2, 2.3, and 2.4 of Appendix 2A-3, ANSI/ASME NQA-1. If examinations are performed by outside agencies, copies of course completion certifications and notification of successfully completed examinations shall also be retained in corporate QA personnel files.

8.3.2 Auditor and Technical Observer Training Records

Auditor and technical observer training and orientation as required by section 8.2.2 above shall be documented on a standard QA training record (see Exhibit A, P-2.0-1, "Personnel Training"); training records shall be reviewed and approved by the Corporate QA Officer.

8.3.3 Audit Participation Records

Records of audit participation by all lead auditors, auditors, and technical observers shall be documented by the audit log and summary maintained in corporate QA records. The log shall be updated at least quarterly by the Lead Auditor or designated QA personnel, and copies routed to the individual corporate QA personnel records for the auditors and observers so identified. 4

8.3.4 Records of Technical Experience

Corporate resumes documenting the general technical experience and background of all lead auditors, auditors, and technical observers shall be retained in corporate QA personnel records.

LEAD AUDITOR QUALIFICATION RECORD

Golder Associates

Auditor	Date	
QUALIFICATION POINT REQUIREMENTS		CREDITS
Education-University/Degree Date	4 Credits Max.	
1. Undergraduate Level 2. Graduate Level		
Experience-Company/Dates	9 Credits Max.	
Technical (0-5 credits), and Nuclear Industry (0-1 credit), or Quality Assurance (0-2 credits), or Auditing (0-4 credits)		
Other Credentials	2 Credits Max.	
1. 2.		
Rights of Management	2 Credits Max.	
Justification: Evaluated by: (Name and Title)	Date	
	Total Credits	
AUDIT COMMUNICATION SKILLS		
Evaluated by: (Name and Title)	Date	
AUDIT TRAINING COURSES		
Description: 1. 2.		

AUDIT PARTICIPATION, INITIAL QUALIFICATION*

Location	Audit	Date
1.		
2.		
3.		
4.		
5.		

EXAMINATION BY:	PASSED EXAMINATION ON (Date):
AUDITOR QUALIFICATION CERTIFIED BY: (Signature and Title)	Date Certified
AUDITOR QUALIFICATION CERTIFIED BY: (Signature and Title)	Date Certified

ANNUAL EVALUATION (Signature and Date)					

*Status reports updated and attached annually

Date Request Received
1-30-92

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Cognizant Line Management

Author: T. W. Breyer For EG ERPENBECK — Date 4/20/92

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